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ABSTRACT

This report is designed as a companion to a three-volume report that describes how education and industry skill standards systems operate in the United States. It provides an overview of international efforts to develop processes and systems to "harmonize" the recognition of an individual's competencies and skills across national boundaries. Chapter I presents a general review of the international context and highlights generic differences between U.S. systems and all other countries. Chapters II-IV describe efforts in six countries to organize skill setting standards systems. Chapter II describes two countries that focus on the youth apprenticeship approach to training: Denmark and Germany. Chapter III discusses two countries--Canada and Japan--that focus on the development of skill certification systems for occupations that have a large amount of mobility across jurisdictions--the crafts and trades. Chapter IV focuses on the United Kingdom and Australia, in which the promulgation of skill standards and certification systems are viewed as central to the competitiveness strategy of the overall economies, and the development of the industry-driven skill standard systems are having direct impact on the organization and structure of vocational preparation institutions. Chapter V offers concluding observations. Appendixes provide references for each country's study (58 in all) and technical information on skill standards categories for Denmark, Germany, and Japan. (YLB)

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SKILL STANDARDS SYSTEMS IN SELECTED COUNTRIES

VOLUME IV

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VOLUME IV

SKILL STANDARDS SYSTEMS IN SELECTED COUNTRIES

Prepared for the
U.S. Department of Education
under contract by:

THE INSTITUTE FOR EDUCATIONAL LEADERSHIP

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With the assistance of

The Center of Policy Research of
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Ms. Joan Wills, of the Institute for Educational Leadership served as the Principal Investigator for the project. She also had the lead responsibility for researching the industry based skill programs, providing an overview of the quality assurance organizations, preparing the case study of the United Kingdom, contributing to the case study of Australia, and providing the overview of other countries skill standards systems.

Evelyn Ganzglass and Martin Simon of the National Governors' Association contributed to the effort through review of materials and writing descriptions of industry based skill certification programs. In addition NGA shared with the study team the results of a companion study of nineteen states that are actively involved in the development of skills standards. Dr. Robert Sheets, a consultant to NGA conducted one of the in-depth studies of an industry based credentialling program and provided the case studies of Japan, Denmark and Germany. Mr. Larry Good, a consultant to NGA wrote the executive summary for the study.

Ed Davin of Meridian contributed by writing descriptions of industry based skill certification programs, Dr. Ronald Bird, of Meridian, had responsibility for organizing the information of industry skill standards programs to assess the extent of coverage of the programs within the total workforce. Dr. Eric Rice, of Meridian, had the lead responsibility for the literature search of job analysis and assessment issues, providing one of the case studies of an apprenticeship program, and the case study of Canada and Australia.

Ms. Madeline Hemmings of National Vocational Technical Foundation contributed the materials collected by the Foundation's fifty state survey of education driven skill standards initiatives as well as reviewing materials. Ms. Barbara Border, a consultant to NVTF, had the lead responsibility for preparing Volume II of the report, preparing the summary of chapter regarding education driven skill standard systems, providing the literature review of skill standards in the military, and the use of the DACUM type job analysis in education skill standard programs.

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CHAPTER I
OVERVIEW

A. INTRODUCTION

This report is designed to serve as a companion to a three Volume report that provides a description of the how education and industry skill standards systems operate in the United States *(Overview of Education and Skill Standard Systems in the United States, Education Driven Skill Standard systems in the United States, and Industry Driven Skill Standards Systems in the United States.)* This report provides an overview of international efforts to develop processes and systems to "harmonize" the recognition of an individual's competencies and skills across national boundaries. It then provides information of how six countries have organized skill setting standards systems. These countries are:

- Australia
- Canada
- Denmark
- Germany
- Japan
- United Kingdom

B. ORGANIZATION OF REPORT

This report first provides a general review of the international context and gives the U.S. reader common characteristics that exist in the other countries that do not exist here. It then provides three chapters that describe the efforts in the aforementioned countries (Chapters II-IV.) The materials used to describe each country's systems were drawn from published reports of the country and as well as papers prepared by researchers and commentators on the systems. Chapter V offers some concluding observations. Appendix 1 provides references for each country's study. Appendix 2 contains technical information on skill standards categories for Denmark, Germany and Japan.

C. THÉ INTERNATIONAL CONTEXT

There are several international organizations that have been involved with the development of cross-national standards that directly impact on the ability of an individual or a firm to practice his/her trade or produce or sell services in a country other than one's own. Some of the most salient organizations are described below.

In 1946 the International Organization for Standardization (ISO) was founded to promote the development of international standards and related activities. It is composed of member bodies from over

90 countries, the U.S. member body is the American National Standards Institute (ANSI). ANSI was briefly described in Volume I *Overview of Education and Industry Skill Standards Systems in the United States*. In 1987 ISO published a series of five international standards (ISO 9000, 9001, 9002, 9003, and 9004) that provide guidance on the selection of an appropriate quality management program (system) for a supplier's operation. The series was originally designed for use in two-party contractual situations or for internal auditing. However, the standards are currently being applied under a much broader range of conditions and circumstances and in some cases compliance with one of the ISO standards (or their equivalent) has been, or will be, mandated by a U.S., foreign national, or regional government body if they wish to conduct business in the European Community.

ISO standards must be reviewed at least every five years and this process is currently underway for the 9000 series. One of the areas that is receiving increasing attention within these standards are the guidelines for using quality assurance principles in the "certification" of the education and training services. The American Society for Quality Control (ASQC) has had the lead responsibility for ANSI to develop these guidelines.

ANSI and ASQC are also assisting in the development of new effort that is a part of the planning for the eventual signing of a North American Treaty between Canada, Mexico and the U.S. The draft treaty contains a chapter that recognizes education as an industry sector, for the first time in a U.S. proposed treaty. The presumption is that voluntary standards will be developed for the education sector, just as is being done for other industries. As this work unfolds it will be necessary to harmonize the accreditation of institutions as well as the certification of individuals between the three signatory nations.

The ISO also sponsors the development of occupation specific skill certification standards primarily in occupations that have impact on health and safety. An example of this is in the occupation of welding and ISO has a committee currently establishing internationally benchmarked, multi-leveled skill standards for various forms of welding.

There is a great deal of activity in Europe on trans-national skills recogniztion systems. Within the European Community (EC) there are a series of initiatives influencing the cross-country movement of workers. One of the core "freedoms" of the Single Market is the free circulation of workers. In order to achieve this freedom of movement the approach as been that each country must have a process for recognizing the competencies of individual workers.

There are two forms of certificates that Europe has had to cope with as they have moved toward free movement of workers. The first form is the Certificate of Achievement -- stating how well an individual has done in a course, on an exam, or in practice. The second is the Certificate of Entitlement -- stating what an individual is allowed to do, which is analogous to licensuring in the U.S.

Within the EC there are two different Commissioners that address the two forms of Certification. The License to Practice (or entitlement) is dealt with by the Enterprise, Commerce, Tourism and Social Economy. The Certificate of Achievement issues are dealt with by the Human Resources, Education, Training and Youth.

Comparative analysis regarding qualifications of achievement for industry and craft workers has been delegated to the European Centre for Vocational Training in Berlin (known by the French acronym CEDEFOP) in Berlin. CEDEFOP has been charged with the responsibility of developing tables of qualifications used in each member state for a given vocational/occupation activity and establishing a means of comparing levels of qualifications below graduate level. As of 1989 some 300 occupations had been classified.

There has been a continual problem in the development of trans-national comparisons due to the lack of a common occupational classification system across countries. Europe has found this to be a technical, but cumbersome, stumbling block for comparisons purposes. Therefore it is common to see the comparisons based on "equivalency" categories and levels of required competencies.

As of yet there are no European Qualifications as such that recognizes the worker's competencies but a newly-created European Organization for Testing and Certification is working on a way to simplify certification and test procedures for craft workers.

Another effort underway is to promote international vocational qualifications in all 12 EC countries for common passport in 258 jobs across the continent. The design is built upon the United Kingdom's National Vocational Qualifications model (discussed in Chapter VI) Trans-national industry and union leaders alike, in a joint conference, in 1990 demanded the development of this form of a European skill passport. One of the key areas of concern is the development of a certificate of language competence. The plans are to offer the certificate for language competence at three levels: survival, co-operative working, and autonomous working in a second language. Exams are being developed technical and vocational areas. There are a consortium of organizations involved in two priority areas. The first includes construction, catering and hotel work, electrical installation, tourism, hairdressing, retail and refrigeration. The second includes business administration, microcomputer engineering, computer production and maintenance and media studies.

It is of some interest that these new trans-European efforts are being guided by the model for the development of skill qualifications in the United Kingdom. As will be discussed in more depth latter, the UK's relatively new skills standards effort is designed to be one of the most "transparent" skills standards/certification system. While the development of the standards system has clearly had major reverberations throughout the UK's education and training system the system is explicitly "policy neutral" regarding the place where an individual receives his/her education or training. What matters is what one knows.

All of the countries that are reviewed continue to have skill certification systems that are privately sponsored. These certification systems pre-date efforts of the governments to develop common overarching frameworks as is the case in the U.K. and Australia. In the other countries, where the government sponsored standards systems are more limited in scope, the private and sometime publicly supported skill certification systems continue to enjoy support because they meet the needs of a particular occupation cluster and/or specialty industry.

D. THE GAPS IN THE UNITED STATES SYSTEMS OF SKILL STANDARDS

Before we launch into the descriptions of the skill standards systems in other countries some generic differences between the U.S. systems and all of the other countries are highlighted. These differences are described as "gaps" to help the reader more easily shift through the implications of these international comparisons. There is no intent to place any value judgments in the discussion of the gaps but without noting them it can become very confusing for any reader to draw their own conclusions regarding what appropriate next steps may need to be taken the United States.

GAP 1. Most other countries are more advanced than the U.S. in terms of supporting education and/or work based skill standards systems. One or more organizations have been given the responsibility by the central government to "do something" regarding education and work-based standards. This fact alone is an important step beyond the current U.S. situation. However, it will become obvious as the individual countries are discussed that what they are "doing" varies substantially.

GAP 2. This common thread is that in each of these countries there exist an "exit from compulsory school" examination system that has been supported by the central or territorial governments in various ways. These exams are developed and administered by an independent third party (sometimes the central government, but not the individual school.) The merits or demerits of these examination systems will not be discussed, but recognizing that such a tradition exist in each of these countries but not here will help place in context how many of the skill certification systems were developed.

These exit exams have been used as a primary tool to sort individuals (often very early in the education process) in order to determine which individuals would have access, if any, to post-compulsory education opportunities. In this country we have eschewed formal (by government policy) sorting strategies.

Our post-secondary education institutions do use third party exams constantly for a variety of sorting purposes (recruitment, acceptance, placement in type of courses) but most are focused on academic competencies -- not occupational competencies. There are many in this country calling for something like the exit exam from compulsory school. The Commission on the Skills of the American Workforce report *America's Choice: High Skills or Low Wages!* has advocated a Certificate of Initial Mastery for all young people to take by age 16. A part of the rationale for such a recommendation was to let individuals students, parents, teachers and the general public understand the expectations of what needs to be learned. Another reason for the recommendation was to establish a floor from which a student could then move all to the next level of education and workforce preparation --whether it be through the pursuit of academic or technical studies focused on a specific occupational field. One such advantage of this approach is that it would eventually eliminate the need for postsecondary institutions, vocational preparation programs and job training programs to provide a substantial number of "remedial

education" courses. Additionally, something like a Certificate of Initial Mastery, generally available around age 16, would place this country on par with other countries that have established a common floor (i.e. standards) at least in core subjects such as math, language arts, and science.

GAP 3. There is another common element that runs throughout other countries experiences that does not exist here. There has been a long history of the central government supporting and promoting a third party certification of skills and knowledge gained through the vocational preparation programs. Included in these skills certification processes are formal mechanisms that involve industry and employee representatives in the articulation of the job related requirements. As will be seen these certification systems vary substantially, some only focused on the initial preparation for work, others address not just entry qualifications but include certification for specialties and embrace the master qualifications as well. This again is not an arena where the U.S. has made public policy forays at any level of government.

These gaps in our system need to be considered when reviewing the experiences in other countries.

What follows are descriptions of skill standards "systems" that can be loosely categorized along the following lines:

1. The "**initial preparation**" model is represented by Germany and Denmark. These systems have embedded within them a long and deep history of the employer community assuming key responsibilities for assisting in the schooling of young people.
2. The next can be called the "**craft certification**" model and is represented by Japan and Canada. These systems have been developed to meet the needs of the more mobil or "independent" workers.
3. The "**comprehensive**" model can be found in the United Kingdom and Australia and represents the youngest and still emerging category. In both of these countries traditions from both of the other categories can be found that have helped to influence the design and implementation of this relatively new model.

CHAPTER II

THE INITIAL PREPARATION MODELS

A. INTRODUCTION

The two countries described in this chapter focus on the "youth apprenticeship" approach to training. Both countries have had long histories of involving industry in the education and training of the workforce.

Where initial vocational preparation/learning takes place has been the focus of most of the effort in these two countries. Both countries have struggled with the question of what is the role of the schools versus what is the role and responsibility industry in the preparation of the workforce. They have answered the question somewhat differently in terms of where the learning takes place. Yet, both have been firm regarding the critical role of the industry to establish the skill standards, be centrally involved in the design and implementation of the certification of skills.

Both countries, like most in Europe, have been forced to address the issue of upgrading and retraining of the current workforce in the past decade. They have found, for a variety of reasons that are not the focus of this report, that no matter how strong the initial education and training that a person received it has not always been sufficient as economic and technological shifts have occurred in the country. Essentially separate training systems have emerged for the current workers and they do not have the tight linkages that dictate the role of the various partners in setting standards and certifying skills competencies.

Both countries frameworks are essentially school to work transition models.

B. DENMARK

Context

Denmark's basic vocational education and training system has been widely recognized in the United States as a leading school-to-work transition system that integrates the strengths of the German Dual System, and related European apprenticeship systems, and the strengths of an American-style school-based vocational education system. This system also has been used as an example of the importance of national skill standards and certifications in school-to-work transition systems.

The initial training of skilled workers, especially in commercial and trade occupations, in Denmark is undertaken mainly within the basic vocational education and training system. As in the German Dual System, the cornerstones of this system are the strong governance role of business and labor organizations and the combination of practical training in companies and practical and theoretical training in schools. As in Germany, this system has its roots in the Danish guild and apprenticeship systems dating back hundreds

of years. However, its current institutional and legal arrangements have evolved from these beginnings through efforts in the 1970s to create a new form of school-based initial training, called "efg" (erhvervs fagliche grunduddannelse), and recent legislative changes to bring apprenticeship and efg models together into one comprehensive system. The current administrative and legal structure of this comprehensive system, was established in the legislative reforms which came into effect on January 1, 1991. This new basic vocational education and training system combines what was formerly the apprenticeship and efg systems and other types of initial technical education and training for the transition of youth from school to employment.

This new system provides approximately 50 percent of Danish primary school leavers with a highly structured transition from initial schooling to the workplace and to further training and education. This new system provides training opportunities, usually three to four years in duration, in a wide range of skilled occupations in virtually every private sector industry including agriculture, construction, manufacturing and service industries. The new system has reduced the number of training programs by about 50 percent, from roughly 300 types of training occupations in the old systems, to about 86 training concentrations with varying degrees of recognized industry and occupational specializations.

The Education Framework

As shown in Figure 1, compulsory schooling in Denmark consists of nine years of primary and lower secondary education (Folkeskole), with a voluntary 1-year pre-school year and an optional 10th school year.

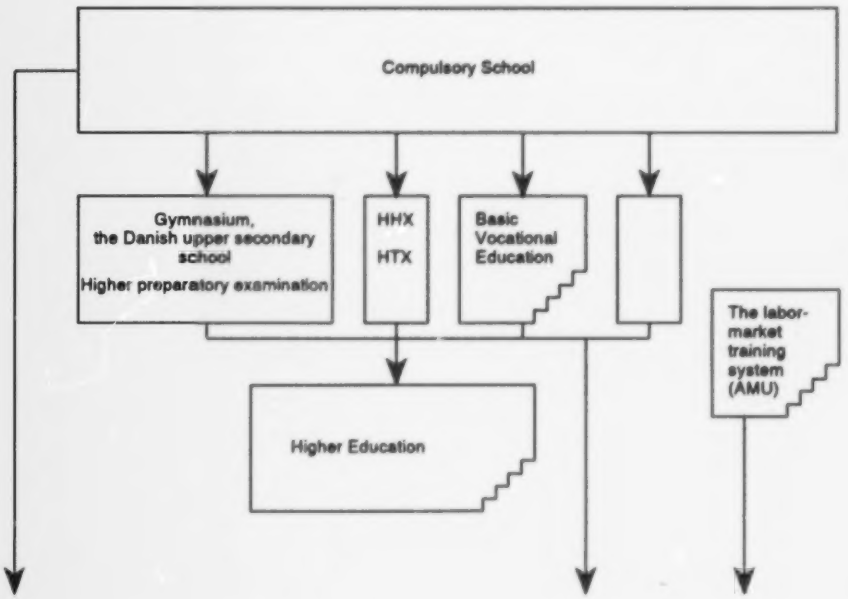
Beginning in the seventh year, about age 14, Danish youth begin preparing for a career through career education, assessment, and counseling. Students spend considerable time, up to 30 days, during the last three years of primary education, in direct contact with employers through field trips and work experience (National Center on Education and the Economy, 1990). Upon completion of the 9th or 10th year, students have the option of taking a national examination, either the Leaving Examination for 9th year or the Advanced Leaving Examination for the 10th year. Upon leaving school, students receive a leaving certificate indicating subjects taken, grades for the 8th, 9th, and 10th years, and their examination results.

About 90 percent of students enter some form of secondary education. About 30 percent enter the three-year Gymnasium programs leading to the upper secondary school leaving examination (Studentereksamen) which qualifies students for university entrance. Most enter some type of long-term university program. Another 10 percent enter the Higher Preparatory Examination Course (HF), which is a two-year course preparing students for the entrance exam for higher education. Most HF students have been away from the education system for more than a year after completing the 10th year of Folkeskole and use the course to go on to further higher education, mostly shorter higher education programs than Gymnasium students.

The remaining 50 percent of primary school leavers enter either the Basic Vocational Education and Training System (called Basic Vocational Education in Figure 1) or the higher commercial (HHX) and the

Figure 1

Progression Paths in the Education and Training System



Source: Danish Ministry of Education and the Danish Ministry of Labour (1992). *Vocational Education and Training in Denmark.*

higher technical examination courses (HTX). Most vocational courses or programs require that students have completed nine years of schooling and the Leaving Examination. Some vocational courses require completion of 10 years of schools and the Advanced Leaving Examination. Students have free access and choice of careers and commercial and technical schools or colleges. Students are expected to find their own training contracts with employers with assistance from the schools, government employment agencies, and business and labor organizations.

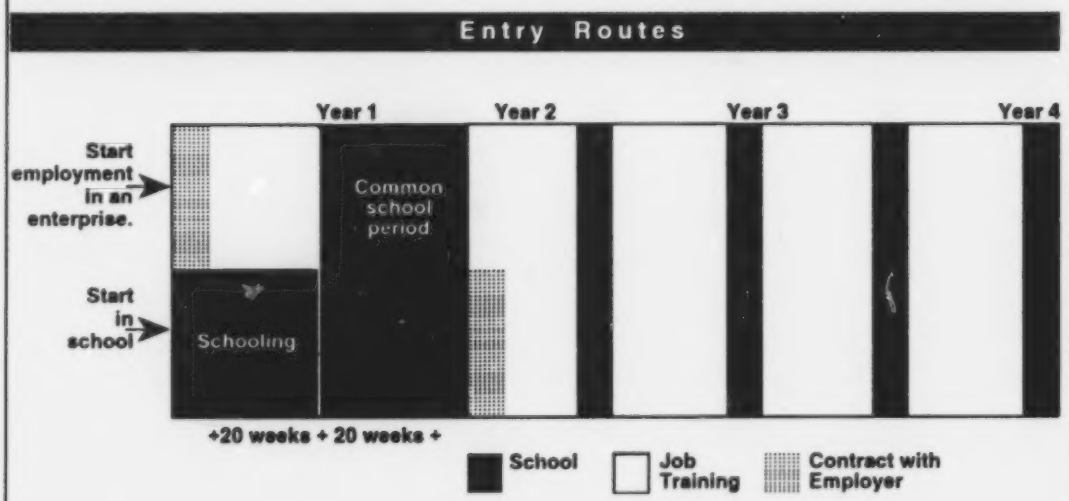
The higher examination courses are 3-year school-based programs that provide students with both general education, like other upper secondary schools, and vocational-technical education. These courses are divided into two blocks. The first block is a one year vocational training period which students will typically take along with the first-year students in the basic training system. The second block is two-year theoretically-oriented vocational curriculum that prepares students for a national examination that qualifies them to continue at the University or other higher education institutions. Students in the basic vocational courses also can take additional courses to qualify for entrance into higher education as shown in Figure 1.

Training in Companies and School

The structure of the basic vocational education and training system is based fundamentally on the traditional apprenticeship system in Denmark in which students prepare for qualifications in a selected trade or occupation through training provided by an employer and related theory instruction provided in a commercial or technical school. The first commercial and technical schools were established privately through local trade and craft associations to supplement workplace-based training. They slowly were transformed into public institutions with strong governance authority given to business and labor

Figure 2

Training Timetables in Companies and Schools



Source: Danish Employers Confederation (1992). *The Danish Vocational Education and Training Systems in the Single Market.*

organizations at the national and local levels. During the 1970s, the Ministry of Education formed a commission to study the limitations of the apprenticeship system which was formalized in national legislation in 1956. Most criticisms focused on the lack of student choice and flexibility, the coordination between training in schools and workplaces, and the poor quality of workplace-based training. The result was the creation of a parallel efg system that was eventually expected to replace the traditional apprenticeship system. The efg concept was similar to the Basic Training Year in the German Dual

System. Students entered a 6-month to 1-year program in schools to explore and receive training within a broad occupational group before entering a training contract with an employer for occupational training and qualifications. The implementation of the efg approach presented new problems, including growing private sector concerns, and resulted in efforts to integrate both approaches into one comprehensive system.

In 1991, the apprenticeship and efg approaches were replaced by a combined system with two widely recognized entry points. As shown in Figure 2, students can begin their training through a training contract with an approved company, or start a 20-week introductory course at a commercial or technical school.

All students then enter a 20-week training period in schools. Students without training contracts and who received their initial training in the introductory course then are expected to find training contracts with approved employers. All students with training contracts then proceed to three to four additional years of training with alternative periods of training in schools and workplaces, with a maximum of 80 weeks of schooling.

Partners, Management and Governance Structure

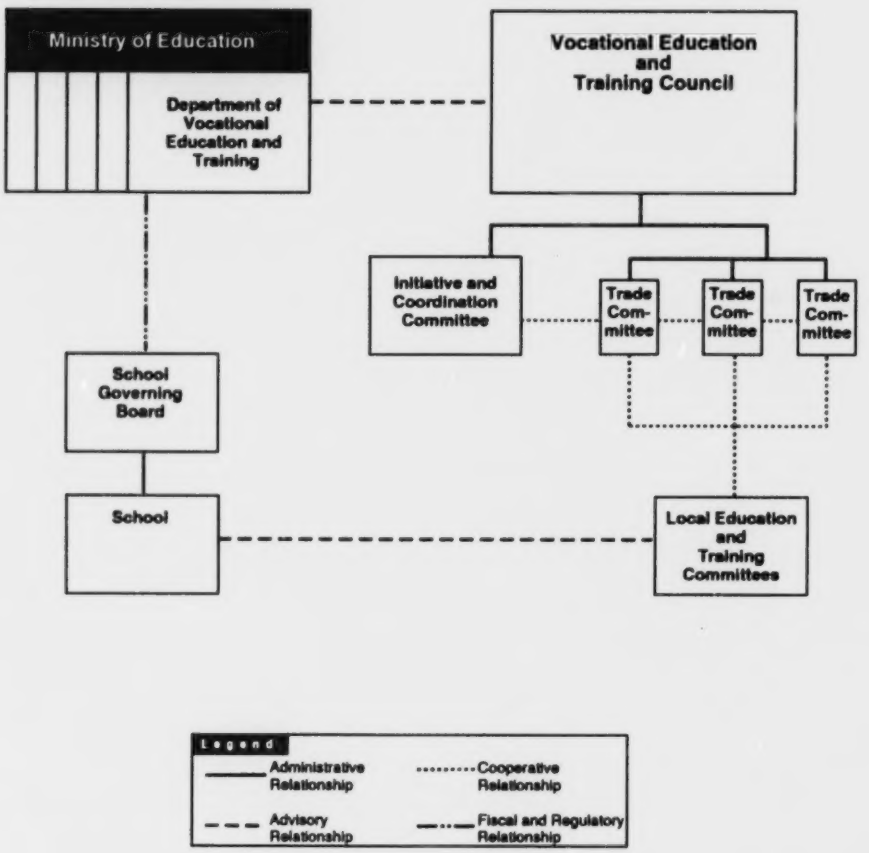
As shown in Figure 3, Ministry of Education through its Department of Vocational Education and Training has the central authority for approving training courses or programs and establishing training regulations in the basic training system based on the recommendations of the Vocational Education and Training Council, a national advisory council. Although the council is only advisory, the Minister is required to consider the council's recommendations and, in practice, usually approves recommendations based on the consensus of the council. The major duties of the council are to submit recommendations for the structure of training, training objectives, examination requirements and procedures, and teacher qualifications for existing or new training courses. The council also establishes recommendations on legal rights of students in the training systems. It does this by establishing trade committees and setting priorities for national initiatives and research and development projects.

The council consists of twenty voting members representing business, labor, education, and government. The Danish Employers' Confederation and the Danish Confederation of Trade Unions each appoint eight members according to the business-labor parity principle followed throughout the basic training system. The remaining members represent county and municipal governments, school administrators and teachers, and the Ministries of Labour, Industry, and Education. The chairperson is appointed by the Ministry of Education.

The national Trade Committees are responsible for developing recommendations to the council on training duration, structure, and objectives, and examination and certification requirements for a particular trade or occupation recognized in the system. The committee also certifies businesses as qualified training establishments to accept apprentices and arbitrates disputes between apprentices and companies over the execution of training contracts. The trade committees consists of equal numbers of representatives from businesses and workers (the parity principle) who are appointed through a nomination process by the

Figure 3

Administrative Structure of the Basic Vocational Education and Training System



Source: Danish Employers Confederation (1992). *The Danish Vocational Education and Training Systems in the Single Market.*

relevant business and labor associations. The activities of these trade committees are coordinated through the council and the Initiative and Coordination Committees.

The commercial and technical schools are self-governing educational institutions with their own governing boards which have considerable managerial control over the schools and determine the mixture of approved training courses they offer and other related training activities to meet local needs. In 1991, there were 112 commercial and technical schools. The governing boards normally have 6 to 12 members. Two members represent the county and municipal councils with the remaining members representing

business and labor organizations on an equal basis. Each school also has one or more Local Education and Training Committees for each approved training course. These committees are responsible for advising the schools on course curricula and assuring that school programs are meeting national standards, assisting in finding approved training places in companies, assisting in conducting certification examinations, and generally promoting public-private cooperation in the labor market.

Standards and the Standard Setting Process

The central role of national skill standards in the basic training system is best understood in the context of the new reforms in how the system is managed at the national and local levels. These reforms restructured school financing based on block grants and the number of students choosing to enroll in the schools. These reforms also decentralized school management and curriculum development giving schools much more autonomy in how they spent money and how they designed their instructional systems. The Ministry of Education established a new national regulatory system based on core training objectives standards or curriculum frameworks instead of detailed national curricula, and encouraged schools to work closely with their local education and training committees to tailor their training programs to local needs within these national frameworks.

Ministerial Orders on Vocational Training Courses

The Ministry of Education, based on recommendations from the Vocational Education and Training Council, issues ministerial orders on recognized training courses or programs offered through the basic training system. These orders are similar to the training ordinances issued by the Ministry of Education and Science in the German Dual System. However, they are not as detailed. The first chapter of the ministerial order defines the scope of the basic course and the recognized specializations. For example, in the electronics course or program, there are three major recognized specializations including electronics mechanic, radio mechanic, and business machine mechanic. The second chapter defines the duration and structure of the course including the number and length of the required training periods that alternate between school and the workplace. For example, the electronics course is a four-year course which is complete after the 7th school period. The theoretical education at school consists of 75 weeks of instruction. The order defines the length of each training period in the school and in the workplace for each specialization. The third chapter of the order addresses the learning objectives or aims of the course and recommended scheduling and length of general education and elective courses during the training periods. This third chapter also lists the more detailed learning objectives for each of the school training periods and the workplace training periods. For electronics, the ministerial order lists training objectives for each of the seven school training periods and each of the seven workplace training periods for each specialization. The final chapter of the order specifies the content and procedures for the final certification examination. The order specifies whether certification will be based on written and/or practical examinations and the content and length of each examination. In electronics, the ministerial order requires

both a written and practical examination. The order specifies a 2-hour written examination covering theoretical issues defined in the training objectives for basic subjects, course-wide subjects, and specialization subjects. The order requires a practical examination that minimally covers a specific set of practical skills for each course specialization that must be demonstrated through 1-hour assignments under specified conditions. For example, for the office machine mechanic, the practical examination must include an assignment on mechanical and electronic fault finding on office machines or office automation equipment.

Assessment and Certification

The certification process for students is based on the general training and certification regulations and the orders for specific training courses issued by the Ministry of Education. The certification examinations (written and/or practical) are conducted at the schools through an examination committee consisting of a school teacher and external examiners representing both business and labor organizations. In most training courses, these certification examinations are national examinations developed under the auspices of the national trade committees in cooperation with local education and training committees. These examinations are sent to the local examination committees at the end of the regular training periods who then conduct the written and/or practical examinations and determine certification.

C. GERMANY

Context

The German Dual System has been widely recognized as one of the leading school-to-work transition systems in the world and has been held up as a model for the U.S. to emulate as it searches for new ways to improve the transition from school to work. Skill standards play a central role in the German system and the importance of the standards must be understood by Americans when considering ways to adapt portions of the Dual System in this country.

The initial training of skilled workers in the Federal Republic of Germany is undertaken mainly within the German Dual System, commonly known as the German apprenticeship system. Although the German system has its roots in guild and apprenticeship systems dating back hundreds of years, the term "Dual System," and many of its current institutional and legal arrangements were established in the 1950s and 1960s through an array of social, educational, and commercial legislation and a complex governance structure that balances the interests of employers and unions, federal and state (Länder) governments, and the educational system. The school side of the system rests mainly in education legislation of the state governments and federal-state cooperative arrangements. The current administrative and legal structure of the system, especially its national skill standards component, was established in the 1969 Vocational Training Act and the 1981 Act for the Promotion of Vocational Education.

The system provides approximately 70 percent of German youth leaving school between the ages of 16 and 18 with a highly structured transition to the workplace and to further training and education. The system provides training opportunities in occupations in the youth labor market (e.g., sales clerks, automotive mechanics, bakers, hairdressers) from which youth move on to different occupations in their adult years. It also provides training for lifetime employment in high-wage occupations in leading industries such as banking and finance, metalworking, and the chemical industries. As shown in Appendix B, the system covers approximately 370 recognized skilled occupations in almost every major industry.

Entering the German Dual System

German youth are selected to enter the Dual System before they enter secondary schools. The educational system presents career and occupational choices to young people and their parents during the transition from primary to secondary school, between the fourth and six grades, when students enter one of three major types of secondary schools based largely on their primary school performance. The Gymnasium, the highest track for secondary schooling, provides the pathway to universities and the professions that are outside the Dual System. The Realschule, the intermediate track, provides the pathway to high-wage, middle-tier technical and white-collar commercial occupations through either full-time postsecondary vocational schools or the Dual System. The Hauptschule, the lowest track, provides pathways to lower-tier occupations in the service sector largely through the Dual System. Approximately 30 percent of all secondary students are enrolled in the Gymnasium, 30 percent in the Realschulen, 32 percent in the Hauptschulen, and approximately 6 percent in all other types of secondary schools.

After they complete compulsory secondary schooling at age 15 or 16, German youth are required to continue full-time education or enter formal vocational training through the Dual System for two to three additional years. Most German youth are provided a formal career education program before they complete compulsory schooling, especially in the Realschulen and Hauptschulen, and are given individualized career counseling as well as the opportunity to explore a variety of careers. In addition, the Federal Institute of Labour provides all students with career and vocational counseling (including counseling for university entrance and the professions) through a national network of local employment offices and newly established vocational information centers.

German youth enter the Dual System by applying for a training position with an employer who has been registered by a regional business organization, usually a Craft Chamber or a Chamber of Commerce and Industry, to provide apprentice training under Federal guidelines. German youth are responsible for finding their own training positions in one of the formally recognized occupations, although the schools, local employment offices, and the Chambers assist them. Employers establish their own hiring criteria, which usually include a particular type of school leaving certificate, strong school performance, and acceptable performance on their own hiring examinations. Employers and newly hired apprentices must sign a formal training agreement based on federal guidelines and register this formal agreement with the appropriate business organization, which is responsible for monitoring the execution of this agreement over the required training period.

Training and Certification in the Dual System

The German Dual System coordinates two to three years of vocational training taking place within two separate institutional spheres: (a) private firms and business, trade, and labor organizations, and (b) schools and related educational organizations (see Figure 1). German apprentices receive about 60 to 80 percent of their training in the private-sector training system characterized by an ever-widening array of learning venues including on-the-job training, workshops or laboratories, within forms, and training centers and external training vendors (Munch, 1991). They spend the remaining time in part-time vocational schools (Berufsschule) as required by compulsory education laws. When they complete the required training, they take formal examinations to qualify for certification as journey-level workers. Such certification enables them to enter further education and training.

Partners, Management and Governance Structure

The two sides of the Dual System have different governance and legal structures, different types of skill standards, and different learning places. As employees and trainees in private firms, German apprentices are trained under Federal training ordinances or skill standards. This training is based on a national skill standards system consisting of recognized occupations, outline training plans and examination requirements. As students in school, apprentices are trained under required outline curricula established by the states based on national guidelines and standards.

The two sides of the system are harmonized through a process that integrates the national skill standards with the standards embedded in the required curricula and timetables for schools. The skill standards system and the legal and administrative structure within which it is developed and maintained must be understood from both sides of the German Dual System. This case study will focus on the national training ordinances used for regulating the private employer side of the system and constructing the assessment and certification process. These ordinances provide a major basis for developing national and state curricula outlines for the vocational schools.

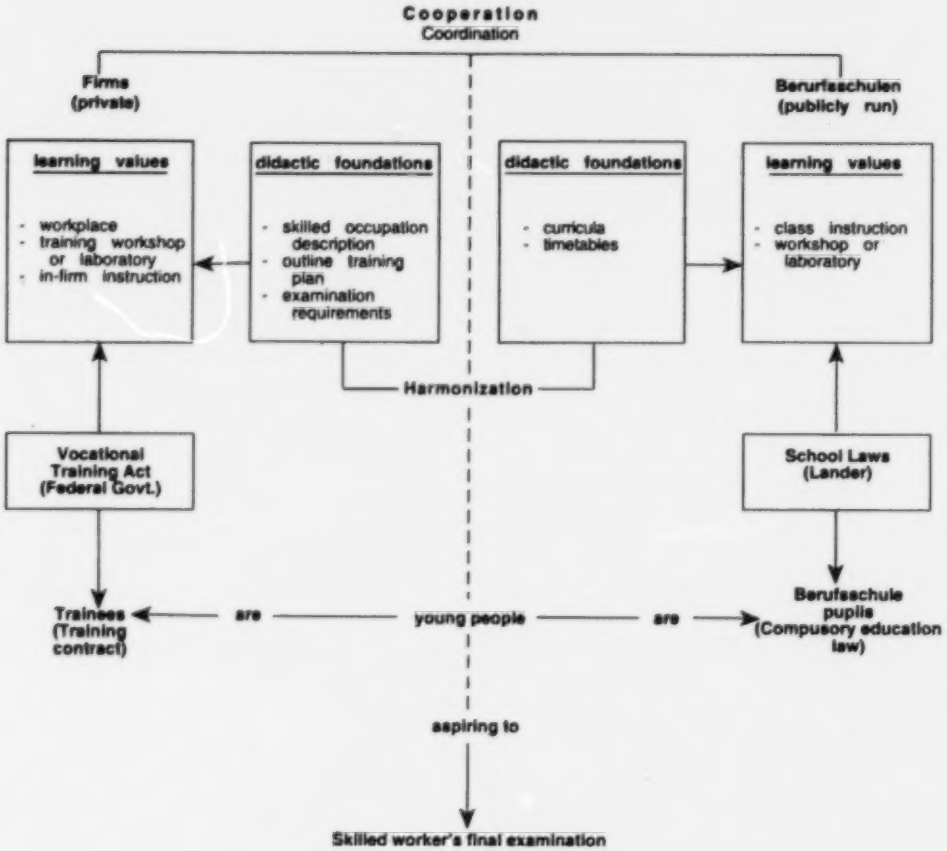
Federal ministries governing each occupation establish training ordinances in cooperation with the Federal Ministry of Education and Science. The cornerstone of the national skill standards system for the private employer side of the German Dual System is the Federal Institute for Vocational Training (Das Bundesinstitut fur Berufsbildung BiBB). The BiBB prepares the national training ordinances used to guide and regulate private employer training recognized skilled occupations.

The governance structure of the BiBB reflects the delicate balance of power between the social partners in the German Dual System. Although the BiBB is administered by the Federal Ministry for Education and Science, it is governed by a Central Committee, which sets policy for the development and dissemination of national training ordinances. The committee consists of eleven representatives from employers, workers, and the State governments, together with five representatives from the federal government who collectively have eleven votes that must be cast only in uniformity (Munch, 1991).

The secretary-general of the BiBB, with the approval of the Central Committee, periodically forms

Figure 4

The German Dual System



Source: Joachim Munch (1992). *Vocational Training in the Federal Republic of Germany.* Berlin: Centre for the Development of Vocational Training

committees of experts to create new training ordinances or revise existing ones. These committees are usually formed because a leading business or unions organization has requested that an ordinance be modified. Such requests can also come from the Central Committee and BiBB itself as well as Chambers, the Land Committees for Vocational Training, and the Federal Ministries. Committees of experts consist of teachers, industry trainers, and incumbent workers nominated by leading business and union organizations and the Lander. They conduct studies of the new skill requirements in a recognized occupation, with the assistance of professional BiBB staff, recommend changes in training ordinances to the Central Committee.

The committees of experts and the Central Committee seek widespread consensus among the social partners in the industry before making their recommendations. In practice, ordinances are not developed or approved without the full support of appropriate employer associations and trade unions. Once approved, the new ordinances are disseminated through the Ministry of Education and Science in cooperation with other federal ministries.

Under the most recent national vocational act, initial training in recognized at employer component of the Dual System must be conducted in "recognized training occupations" on the basis of national training ordinances. The ordinances specify the recognized occupation, the duration of training, the knowledge and skills to be imparted, guidelines for the organization of training, and requirements for the final qualifying examination.

As illustrated through the metalworking example in Figure 5, national training ordinances establish the relationships between recognized occupations within an industry or an occupational field.

The most sweeping changes in the ordinances over the last ten years were a series of new requirements that broadened most training for occupations emphasizing broad-based industry or vocational training in the first year. Three major considerations drove these changes. First, new skills required in the modern workplace made many traditional occupations obsolete. Second, the modern workplace required broader training to develop the flexibility trainees would need to participate effectively in work teams. Third, some apprentices required more time and stronger basic skills to meet the higher requirements in the second and third years of training. In addition, some apprentices needed more time to explore career opportunities with a particular industry or occupational field before choosing a training specialty.

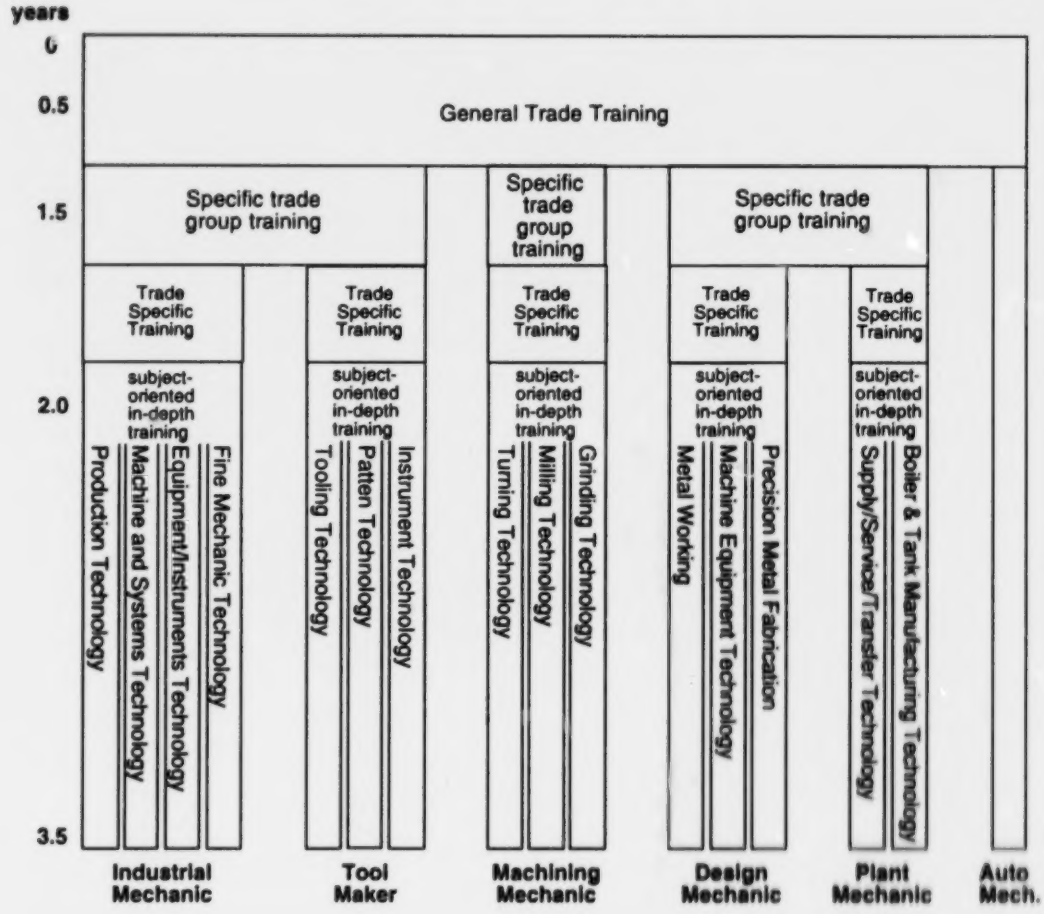
Under the new training regulations, training ordinances can be organized according to one of three structures (Munch):

- Mono-training provides for a uniform definition of a skilled occupation and a single training plan for all trainees with no specialization during the three years of training. Mono-training is common in many of the craft trades and lower-skilled occupations requiring only two years of training.
- Mono-training with specialization provides broad-based training in the first year with increasing specialization in the second and third years either through "internal specialization" specified in the training plans or "external specialization" obtained by clustering separate occupations with common training in the first year as in the metalworking example in Figure 2. Major manufacturing industries such as the chemical industry follow this approach.
- Polyvalent (graduated) training provides a more modularized structure in which trainees can undergo broad-based training for two years, pass a qualifying examination, and obtain skilled employment. Trainees can then train for more specialized occupations in programs (usually less than a year each) that build from their broad qualification. This structure is used in many construction occupations.

Despite sweeping changes, there is still a large number of traditionally defined occupations, especially in the traditional craft occupations (see Appendix A). They are concentrated among small businesses in craft-dominated industries.

Figure 5

Recognized Training Occupations in the Metalworking Industry



National training ordinances describe the skilled occupation, (Figure 6), set requirements for qualifying examinations, and outline the training plan used to establish formal training contracts between trainees and employers (Figure 7).

The outline is published in large booklets that specify the legal and technical requirements for training contracts and recommend the order in which training is to occur for the complete training period. Taken together, the combination of the occupational designation, outline training plan, and examination requirements represent the core of "national skill standards" in the German Dual system. They provide a clear statement of what trainees should know or be able to do to qualify as skilled workers within a

Figure 6

Occupational Description in the German Training Ordinance

Industrial Mechanic
Technical Field: Plant Technology

Work Area
On the basis of his/her vocational training the Industrial Mechanic in the technical field of Plant Technology is qualified to perform work assignments in the area of operating and resuming of operation of machines and equipment.

Tasks
Their tasks can incorporate: inspections, maintenance, and repair of machines and equipment as well as adjusting operating equipment to changing conditions. They disassemble and assemble components and unit groups in order to maintain operating conditions, confine errors, eliminate interferences and effect restarting the machines or equipment after checking proper functioning.

These work procedures require a high degree of awareness as well as the ability to recognize the wear and tear conditions (on the machinery) and carry out or initiate appropriate repair work taking into consideration technical as well as economic considerations. Special perceptiveness and communicative skills are required for safety precautions at the repair place and the transport of the replacement and dismantled parts as well as in cooperating with other departments. Putting support beams or scaffolding into place needs to be accomplished with consideration for the remainder of the fully operating plant.

These tasks are mainly performed outside of production sites and repair shops at changing locations.

Figure 7

Overview of Training Outline in the German Training Ordinance

Educational Subjects	Time Standards per Week in Training Year 1	2	3/4
Basics of vocational training, corporate structure and organization of training facility, labor and corporate law, job protection, safety of work place, environmental protection and economical energy utilization.	-	-	-
Reading, applying and writing technical documents, identifying, categorizing and handling work materials and operating supplies.	4	4	4
* Planning and controlling of work flow and sequence of movements, checking and evaluating the results.	5	6	
* Maintenance of work equipment and production facility.	2	2	
* Quality control, marking off and labeling.	3	1	
* Adjusting and clamping of tools and work pieces.	2		
Manual cutting.	8	5	
Machine cutting.	4	6	
Separating, shaping.	4	2	
Joining.	8	2	
In-depth treatment of vocational basics training.	12		
Installation and testing of pneumatic circuits.		3	
Assembly of unit elements and groups.		18	
Testing and adjusting of single functions at unit groups by gauging and recording of data for work movements and production values.		3	
Thermal separation, hot-shaping: Fusion welding.			5
Installation and testing of hydraulic circuits as well as electrical components of control engineering systems.			15
Disassembly and assembly of equipment and unit groups.			8
Installation, mounting, connecting of machines, equipment and unit groups.			8
Transport and securing.			3
Checking and adjusting of functions on unit groups, machines or systems.			5
Recognizing, limiting and correcting errors and failures.			16
Start up of machines or systems as well as maintenance of operating functions.			14
	52	52	78

The Competent Bodies and the Administration of Training Ordinances in the Private Employer Training System

National training ordinances are administered and enforced on the private employer side of the Dual System through legally recognized "competent bodies." For most industries and occupations, these bodies are the Chambers of Commerce and Industry and the Craft Chambers. Their responsibilities of the Chambers in the German Dual System are to promote vocational training; approve training contracts; determine the suitability of the training firm; monitor the quality of training programs; admit candidates to qualifying examinations; provide training for Meisters and develop and conduct certification examinations; develop and conduct the final examination through an appointed examination board; and maintain records on all approved training contracts and the results from final qualifying examinations.

Vocational Training Committees, which consist of six employer representatives, six employee representatives, and six vocational school teachers carry out these activities. The committee structure institutionalizes the role of the social partners in the regional administration of the training ordinances and in maintaining the overall quality of training in companies. However, the financing and governance structure of the Chamber (i.e., employer association based on mandatory business membership fees but voluntary involvement in the Dual System) insures an overriding employer perspective.

The Harmonization Process

The vocational school side of the Dual System is a separate network controlled largely by government agencies, educational institutions, and professional associations. The states have primary responsibility for schools in Germany. Each has its own laws and policies governing schools including the vocational schools in the Dual System. Each state develops its own curricula, usually through centralized commissions of teachers or special curriculum institutes. Although the Standing Conference of the Ministers of Culture ensures a certain degree of uniformity through its nonbinding outline curriculum agreements, the states differ significantly in attendance requirements, curriculum, and types of student certification.

The vocational school is unique in that it functions under two quite separate systems for determining formal education and training objectives and standards. One the one hand, the school must provide general education for about 40 percent of a student's time including political, civic, and religious education. On the other hand, it has a formal mission to provide students in the remaining 60 percent of their time with a theoretical and technical foundation in their chosen occupations with special regard to the requirements for vocational training in firms (Munch, 1991). The vocational school curriculum must support the training required in the national training ordinances and prepare students for the qualifying examinations. The national training ordinances provide a common framework for the articulation between vocational school curricula and training contracts.

Despite the national policy linking the two sides of the system, harmonization of school curricula and training ordinances has been a persistent problem. The reforms that established the basic training year

in the early 1970s led to the establishment of a formal harmonization process between the Lander and the BiBB. As shown in Figure 1, the Central Committee has a permanent subcommittee, the Lander Committee, which articulates new training ordinances with the curriculum outlines and timetables the federal states use to administer vocational schools. Under a new protocol, either the BiBB committees or the Lander Training Committee can initiate a review of a particular occupation. The protocol then requires a series of three joint meetings between experts for BiBB expert committees and Lander curricular committees. At each step the two sides follow the standard review and approval processes established in their own systems. At the end of this process, the two sides jointly implement a set of curriculum outlines and training ordinances. The process has improved articulation but has yet to fully address the coordination problems inherent in the Dual System.

Assessment and Certification

Federal regulations require that competent bodies such as the Chambers establish a certification system for all apprentices within their regions. These regulations establish minimum requirements including notification procedures, admission requirements, the composition of examination boards, and the structure and content of examinations.

Under federal regulation, examining boards must consist of at least three members with employers and workers represented equally and at least one vocational teacher. Members are appointed for three years. Worker representatives are appointed by the local trade unions and independent associations of workers. Employer representatives are appointed by trade and business associations including the Chambers. The members elect a chair and deputy chair which usually alternate between an employer and worker representative. In practice, the examining boards are dominated by the employer and worker representatives. There are currently no formal training requirements for examiners.

Although federal regulations establish the core content and structure of the examination, the examining boards are responsible for developing and administering the examination. However, most Chambers and their examination boards have created centralized entities to develop examinations for different occupations. The result has been the increasing nationalization of certification examinations.

Federal regulations require all apprentices to undergo an intermediate examination to assess their progress toward final certification. Results are shared with the apprentice, school instructors, company trainers, and Chamber advisors to identify training problems and take corrective action. In order to be admitted to the final examination, the apprentice must meet three major admission requirements: (a) completion or near completion of training, (b) successful completion of the intermediate examination and completion of the required "report book," and (c) legal registration of the training contract. The examination includes a written component in a forced choice and short-answer format and a performance component that is conducted in a company training facility or other centralized location. The pass rate is very high, approaching 90 percent in most occupations and apprentices are recognized for exemplary performance. Completion of the training period and the examination results in three credentials: (a) school leaving certificate indicating the completion of mandatory school attendance, (b) journey-level certification indicating the successful completion of the examination and the report book, and (c) employer

recommendation, an optional credential that certifies the performance of the apprentice as an employee. The employer recommendation usually complements the journey-level certification by reporting on "key qualifications" including social and behavioral attributes required of all employees.

The certification process in the Dual system involves a large number of examiners responsible for conducting a large volume of certification examinations. In the late 1980s, over 300,000 examiners in over 200 competent bodies conducted over 1.5 million examinations per year (BiBB, 1991).

Extent of Coverage/Relationship to Further Training and Certification

The Dual system and the national skill standards system that supports it have traditionally provided training and qualifications for youth entering the labor market and further training for the certification of master craftpersons and technicians. Chambers have traditionally offered a wide variety of further training and certification opportunities outside the national training ordinances. In recent years, the BiBB has begun to establish national training ordinances in a wide variety of industries and occupations. The BiBB has already established training ordinances for 190 recognized occupations for further training. However, adult upgrading in recognized occupations and retraining into different occupations remain at the periphery of the system (Munch, 1991). These types of training are usually offered by a variety of training providers in short courses, seminars, and customized training programs. The continued growth of training for the adult workforce will likely renew discussion on coordination between initial and further training programs and certification systems.

Summary and Conclusions

The German Dual System is a leading international example of a school-to-work transition system based on national skill standards. This case study has highlighted the structure and function of the national training ordinances in the regulation of training on the employer side of the system. The ordinances provide quality assurance on the employer side of the system and the certification of apprentices after they complete training. The ordinances have changed a great deal since they were established in the late 1960s, and they are likely to change even more as quality standards in the private sector increase and postsecondary education and further training expand.

CHAPTER III
THE CRAFT MODELS

A. INTRODUCTION

The critical feature that ties Canada and Japan together within the skill standards systems is the focus each has placed on the development of skill certification systems for the occupations that have a substantial amount of mobility across jurisdictions -- the crafts and trades.

Both countries also have "wrap-around" support systems for the entities that have the lead responsibilities for occupational preparation of the workforce for which the central government plays a key role. The organization and manipulation of information for use by a wide variety of users is a central feature of these wrap-around support systems. However, due to fundamental differences in the placement of the center of responsibility for training the workforce -- in Japan the employers -- and in Canada -- the individual provinces the central government information driven support systems have different design characteristics.

B. CANADA

Context

In Canada, training is a reserved power of the province or territory as it is the reserved power of states within the United States. The central level of government does not have a Ministry of Education. Even so, Canada has undertaken a number of initiatives to provide direction and assistance in the standards setting process for the country.

In Canada there is no federal, over-arching organization or policy to provide for creating national standards within industries. It could be characterized as a non-system. Training and the recognition of standards within industries functions as a reserve power of the provinces or territories within Canada. Nevertheless, Canada has undertaken some specific initiatives that have yet to be developed in the United States that support the standards setting process and provide assistance to individuals in the pursuit of career choices.

At the federal level there is a series of initiatives to bring consistency to language and procedures as they relate to the creation of industry and training standards. The series of initiatives include, for example, development and operation of the National Occupational Classification Taxonomy and Job Projection System, the development of trade analyses of selected trades within Canadian industry; a specific concern for special issues such as literacy for new Canadians and the operation of the Red Seal exams.

The Canadian government has undertaken a series of special initiatives as a measure to bring consistency between and among provinces and territories given that provinces and territories, exercise their specific rights to control industry standards and training within their own provinces.

Partners, Management, and Governance Structure

The roles and responsibilities for creating standards in Canada is fairly similar to the traditional way these roles and responsibilities have been allocated in the United States. At the Federal level, the government is responsible for creating and implementing particular initiatives that may have implications for the development of standards. At the provincial and territorial level, the government is responsible for registering specific standards. In addition, provincial and territorial governments provide dollars from the tax base to support training; designate specific institutions within the province or territory as the sites where related instruction and training will take place; provide money to fund training activity; provide tax money for particular initiatives especially in the areas of literacy that are directed specifically at individual trades; fund and coordinate the development of provincially based Red Seal exams among the trades; issue certificates of apprenticeship and journeyman status for people who successfully complete an apprentice program; and register and monitor standards for specific training programs.

The roles and responsibilities of industry within the country, and within provinces, is to represent management and labor in the standards creation and promulgation process. That is, industry is responsible for developing and registering the standards with the provincial or territorial government. Industry also is responsible for working with the designated college usually a two year institution, to arrange for related instruction and supplementary training. In many cases, the industry itself becomes the designated training site for at least some of the supplementary training that is necessary to achieve a skilled workforce. In that situation, the industry actually receives tax dollars for training to pay instructor salary and equipment costs. The industry and the state and territorial governments together are responsible for maintaining records of those who have been trained and have entered into the workforce.

Information Support

The well regarded federal agency, Statistics Canada, the national collection and clearinghouse organization for data has played a key leadership role in providing support to the provinces and industries concerning information needed to develop skill standards.

Within Statistics Canada, one finds the capacity and will to collect far more statistics on the entirety of industry and training in Canada then is collected in the United States. The National Occupation System and Job Protection System was a logical outgrowth of the work of Statistics Canada. Statistics Canada assisted in determining what kind of information employers and trainers needed about jobs, the kind of jobs that should be included, kind of information that ought to be collected. Ultimately, Canada's national occupational classification system is working to create a single job scan checklist where some 2,000 elemental jobs scattered among ten major groups within the dictionary of occupational titles are

merged into a single checklist. The checklist is intended as a taxonomy to help employers and employees determine the skill levels necessary to hold and successfully function in specific types of jobs, and to promote transferability of skills among and between jobs. Data is also used to facilitate the Choices Program, a career development program designed by the Canadian Ministry of Labor, but operated by a private contractor in Canada. Likewise, the information is fed into the job projection system that helps to suggest supply and demand dimensions for particular occupations within the country.

Standards Setting and Standards Setting Process

Within the federal system in Canada there is included the Red Seal exam, occupational analysis, and specific programs intended to stimulate the dialogue regarding national standards. The Red Seal exam, for example, is the assessment of skills used in dozens of trades, province-by-province but that allows for licensure in those trades to be recognized across the entire country. The Red Seal exam functions especially with apprenticeship programs, but is the culminating assessment that happens before someone earns a journeyman card. The Red Seal exam itself is generated by a designated committee of industry representatives who meet together to create a provincial or a territorial examination; and an apprentice must successfully complete this examination in order to earn their journeyman card and certificate in trades that are designated as critical trades in Canada. Typically, the Red Seal exam has two passing levels. One passing level, often set at 65% to 80%, allows an apprentice to become a journeyman and to practice the trade in the province or territory where he or she takes the Red Seal exam. A score of greater than 80% to 85% enables the apprentice to earn a certificate or license to practice their trade in all provinces or territories in Canada. The Red Seal exam process is operated by the Federal Government and is one of a series of initiatives undertaken by the Government to standardize training policy throughout the country.

Another federal level effort designed to help support the development of standards is the National Occupational Analysis efforts undertaken by various ministries. Each year for the last several years, several occupations have been analyzed using systematic job analysis procedures, such as DACUM which was originally developed in Canada. CODAP, Structured Observation, and other techniques are used in order to delineate the specific tasks, skills and knowledge that are required of a particular job in Canada. The results of the occupational analysis are then provided to industry and used to assist in the revision of standards for apprenticeship or for other types of training in order to encourage portability and standardization of curriculum throughout the country, and improvement of the Red Seal exams. The occupational analysis effort also has helped focus attention on occupations that are considered critical in Canada, especially where demand exceeds supply of skilled labor. An additional benefit that has grown from the occupational analysis initiative is the expectation that other industries will reexamine their work and standards and use the data to expand apprenticeship registration activity.

The Federal Government also acts on other specific initiatives that have implications for national training standards. For example, in the last three years, a Secretariat for Literacy has been established and has undertaken a number of projects within a variety of industries to improve the literacy level of the

typical Canadian worker, with special emphasis on the new immigrant to Canada. The literacy effort is particularly noteworthy in terms of national training standards, because with immigration to the United States has been somewhat restricted in the last decade, immigration to Canada from the less developed countries, has grown. In fact, in any trade meeting in Canada one is likely to find not only French and English spoken, but also a variety of other languages including Polish, Portuguese, Chinese and Spanish. The effort of the Literacy Secretariat is to create training programs that provide for English and French literacy training at the work site based around work site issues.

C. JAPAN

Context

One major strength of the Post-war Japanese workforce development system is its major commitment to upgrading and retraining employed workers through extensive company- and industry-based training programs. The system is clearly the most industry-driven model, probably in the industrialized world, yet the federal government performs several critical functions in the skills standards arena.

Japan has a highly structured system for transitioning youth from secondary schools to work and postsecondary education. National skill standards play a key role in establishing student credentials and in insuring quality throughout the system. However, unlike the German Dual System, national educational standards and general academic qualifications and credentials play the central role, with vocational standards and qualifications playing only a minor role (Rosenbaum: 1991; Dore and Sako: 1989). In addition, these qualifications are based largely on standardized test results and recommendations from school instructors because employers rarely provide direct training to high school students before they complete full-time schooling. Employers provide extensive initial and advanced training only to those youth who have been screened and hired as full-time employees based on their school performance.

Initial Preparation

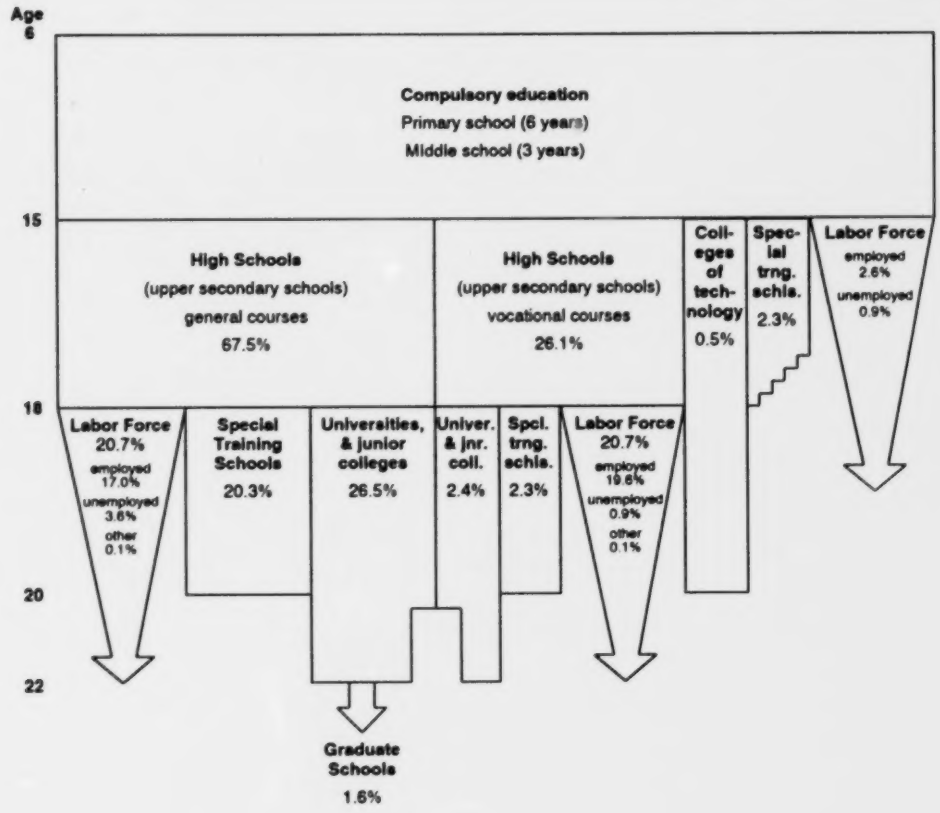
National standardized tests in core academic areas, administered at the end of junior high school and high school, are used by postsecondary educational institutions and employers, especially large employers, as the single most important passport for employment and further education and training (Rosenbaum and Kariya, 1989).

The Ministry of Education has the major responsibility for developing and conducting these national examinations with input from education, government, and industry associations. The national tests at the junior high level determine the opportunities for approximately two-thirds of Japanese youth to enroll in general upper secondary schools. These schools provide the passport to jobs with large companies and further education opportunities in junior colleges, universities, and special corporate-sponsored schools. Japanese students with the highest test scores and best recommendations from teachers have access to the best high schools which, in turn, have special relationships with the best universities and employers.

During the mid-1980s, approximately 40 percent of these general upper secondary school students continued on to universities and junior colleges, another 30 percent entered special training schools, and the remaining 30 percent entered the workforce (See Figure 8).

Figure 8

Transition from School to Work and Postsecondary Education



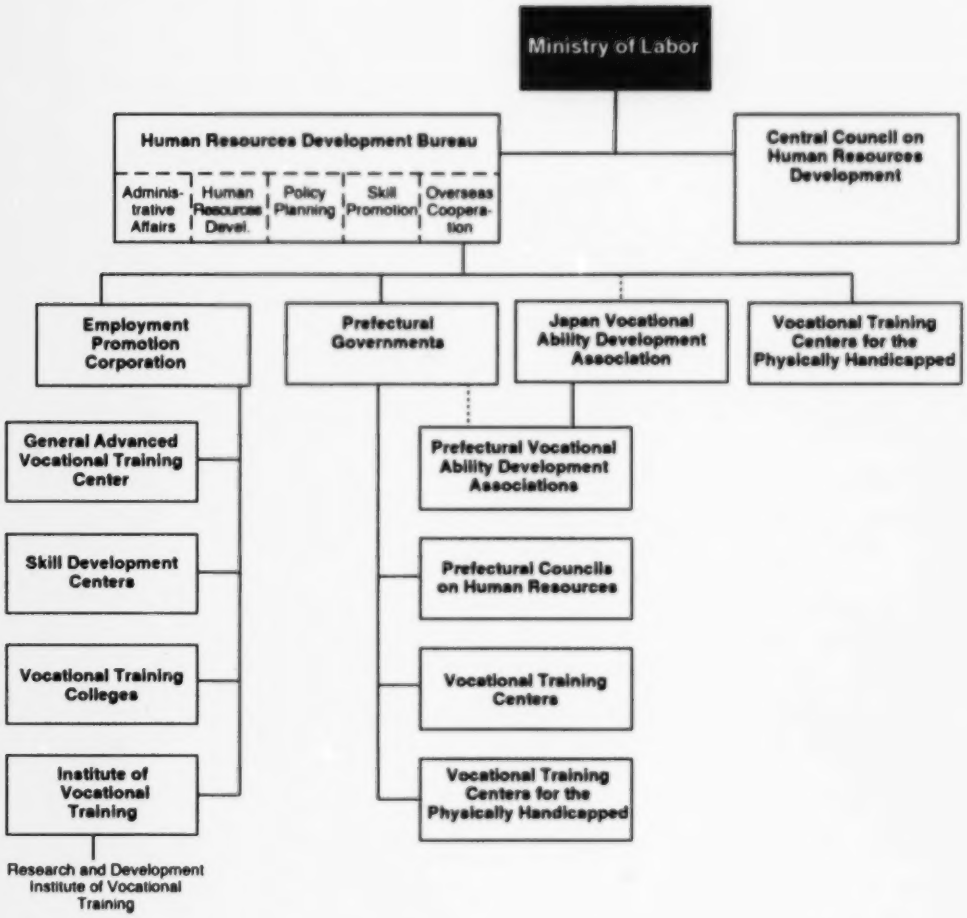
Source: Ministry of Education (1985). *Monbu tokei yoran.* Summary of statistics on education.

Special training schools include both the privately financed Special Training Schools and Miscellaneous Training Schools accredited by the Ministry of Education as well as the vocational training centers financed by the Ministry of Labour (See Figure 9).

Approximately one-fourth of upper secondary students attend vocational schools which offer vocationally oriented programs mostly in commercial, industrial, home economics, and agricultural fields. These schools have a lower reputation, except in some rural areas, and provide students with more limited further education and employment opportunities. In these vocational schools, about three-fourths of

Figure 9

Vocational Training System Administered by the Ministry of Labor


Ministry of Labor
Human Resources Development Bureau
Administrative Affairs
Human Resource Devel.
Policy Planning
Skill Promotion
Overseas Cooperation
Central Council on Human Resources Development
Employment Promotion Corporation
Prefectural Governments
Japan Vocational Ability Development Association
Vocational Training Centers for the Physically Handicapped
General Advanced Vocational Training Center
Skill Development Centers
Vocational Training Colleges
Institute of Vocational Training
Research and Development Institute of Vocational Training
Prefectural Vocational Ability Development Associations
Prefectural Councils on Human Resources
Vocational Training Centers
Vocational Training Centers for the Physically Handicapped

student time is devoted to general subjects and related technical theory. The vast majority of these vocational students go directly into the workforce (See Figure 8).

The Ministry of Education develops national standards and examinations for these vocational schools which emphasize the application of general academic skills to broad vocational areas. The Ministry works with national educational associations, such as the National Association of Technical High School Principals, to develop school-based assessments and national certification examinations.

Principals is an umbrella organization with representation from educational professional associations and industry associations. This national examination system consists of standardized paper and pencil tests that assess the application of general academic knowledge and the core technical knowledge of a general vocational area (e.g., metal technologies, automotive mechanics).

Most employers who recruit from upper secondary vocational schools use these tests for screening students based on their general academic preparation, as in the national general examination, rather than their specific vocational training. Teachers in vocational schools many times encourage their students to take the lower-level trade tests sponsored by the Ministry of Labor, especially the industrial and clerical certificates (see later discussion). However, these trade tests are used mostly to motivate students and are rarely important to employers in selecting students for entry-level employment (Dore and Sako, 1989).

Partners, Management and Governance

Beginning with the passage of the Vocational Training Law in 1958, Japan attempted to create a unified system of vocational training that included a national system of trade testing and certification for workers to promote status and recognition for blue-collar workers (Ishikawa, 1989). Amendments to this law in 1969, brought about major reforms that integrated public and private training systems for recent school-leavers and adult workers through common training standards and guidelines for both initial and upgrade training and the retraining of displaced workers. Further legislative changes during the 1970s and early 1980s strongly emphasized the role of national skill standards and certification in promoting productivity and quality in modern workplaces through a process commonly called "leveling up" (Dore and Sako, 1989). These legislative changes reemphasized the primary role of employers in providing initial and upgrade training to their employees. Government was given a secondary role in supporting the development of employer- and industry-based training systems for employed workers. The national system of trade testing and certification was expanded and strengthened to encourage workers to seek further training, to encourage employers and industry organizations to establish their own formal training and certification systems, and to promote quality within both public and private training systems. This expanded trade testing and certification system was linked directly to the Ministry's Capacity Development Program for promoting private sector training and certification systems.

Given this historical development, the role of the Ministry of Labor's trade testing system must be understood within the context of the Ministry's vocational training programs and training centers and its newer Capacity Development Program.

Ministry of Labor's Vocational Training System

The Federal Ministries in Japan are given major responsibility for establishing long-term plans for human resource development based on the consensus of the major social partners at the national and subnational levels. The Ministry of Labor is responsible for developing a five-year Human Resource Development Plan. This plan is intended to improve the coordination of human resource development and lifelong learning in the public and private sectors. The Ministry of Labor's plan is based on the fundamental assumption that employers have the major responsibility to train their employees and provide them with the necessary encouragement and support to seek further vocational training and obtain both public and private skill certifications. The national and prefectural governments are to act as catalysts and supporters of

employers and industry and trade associations in promoting vocational training for the Japanese workforce.

The Ministry of Labor is advised by a tripartite council consisting of representatives from leading trade unions, employers and employer associations, and prefectural governments (See Figure 9). This Central Human Resource Development Council is given two major responsibilities related to skill standards: (a) establish program and curriculum standards for the training in recognized occupations or skill areas, and (b) oversee the testing and certification systems for these occupations or skill areas.

The Ministry of Labor's vocational training system for non-school workers consists of three major types of training programs differentiated by the type of skills and type of trainee: (a) basic training, (b) upgrading training, and (c) vocational ability redevelopment training. The Ministry of Labor establishes national training standards and curriculum guidelines for accrediting or authorizing over 190 training "courses" or programs, the number which is growing rapidly (See Appendix A). This authorization is necessary for government funding of courses in public and private (mostly in large companies and industry associations) vocational training facilities authorized by the Ministry and for the recognition of prior training or skill acquisition for the Ministry's trade testing and certification system. These training standards specify admission requirements, duration and hours of training, curriculum contents, instructor qualifications, and necessary facilities and equipment for these three types of training courses and programs (Ishikawa, 1989).

Basic training is designed mainly for young workers, especially recent junior high and high school graduates. These training is intended to provide the necessary skills for entry-level jobs through a variety of training ranging from 12-hour short courses to special 2-year courses. Workers completing one of 179 general basic training courses and passing the national qualifications examination carries the recognition of "assistant skilled worker."

Upgrading training is designed mainly for experienced workers who already have basic training and knowledge, but require further training to qualify for higher-skilled jobs or gain additional skills required by their employers. Upgrading training refers primarily to 118 nationally recognized training courses that provide Grade 1 and Grade 2 certified worker training. These courses range from 6-month to 1-year training programs. In addition, upgrading training also includes approximately 15 "monograde" certified worker training courses and approximately 6 supervisory training courses. Finally, upgrading training includes skill upgrading training courses which are short-term training programs to update skilled workers.

Vocational ability redevelopment training is designed for experienced workers who need to retrain into other jobs or occupations. These workers include older workers, displaced workers, and workers reentering the labor market. This training includes short courses for simple jobs, similar to basic training courses, and job conversion training courses which are specially designed modularized training programs developed according to the same standards as the upgrading training courses.

These three types of training programs or courses are delivered through both public and private training deliverers. Basic training courses are delivered primarily through vocational training centers and vocational training junior colleges operated by the national and prefectural governments (See Figure 9).

Upgrading training courses are delivered through vocational training centers, skill development centers, and the Institute of Vocational Training. The vocational ability redevelopment training is provided through vocational training centers and skill development centers. Private sector training systems, including company and industry association systems and the extensive correspondence course system provide approved training courses largely in upgrading training. The correspondence system is a very large component of the private sector training system. The Ministry of Labor publishes a list of nearly 1,200 courses which are eligible for government funding. Many of these courses, especially the commercial and industrial courses are very popular because they help prepare workers for the Ministry of Labor's trade testing and certification and other widely recognized national public and private certifications (Dore and Sako:1989).

Capacity Building Program for Employers and Industry Associations

The Ministry of Labor's Capacity Building Program is financed partially through the Japanese Employment Insurance System. This system was expanded from an American-style unemployment insurance system based on new programs to prevent unemployment and improve employment and training practices in the private sector. It has two major purposes: (a) to provide unemployment insurance benefits, similar to those provided in the United States, and (b) to support four separate employment and training promotion programs. The unemployment insurance component of the system is financed by equal contributions from employers and employees. The four employment promotion programs are financed solely by employer contributions. One of these four programs is the Capacity Development Program. This program provides funding to subsidize employers for vocational training, establish and maintain public vocational training facilities, and subsidize the implementation of skill examinations and other smaller programs.

The Capacity Development Program is closely linked with programs established through the Human Resource Development Act and funded by general revenues from the national, state, and local governments. The Ministry of Labor combines these funds to operate its vocational training system for basic, upgrading, and vocational ability redevelopment training of non-school workers.

The Capacity Development Program is designed in part to encourage employers to become "educational enterprises," that promote human resource development from the top executive to the front-line employee. The concept of an educational enterprise requires that: (a) top executives clearly recognize the functions and role of human resource development, (b) companies establish clear career paths for their employees, and (c) companies establish a comprehensive plan for human resource development. Employers are expected to appoint a human resource professional who is responsible for establishing an internal human resource development plan and providing counseling, guidance, and training and apply for various government benefits to increase the skills of their employees. Employers and industry associations can receive capacity-building grants from the Ministry of Labor to establish training and certification systems. They can receive further grants for basic, upgrading, and vocational ability redevelopment

training courses that have been authorized to provide by the Ministry of Labor. These capacity development grants are directed mainly toward small businesses and industry associations for small businesses who are assumed to not have the resources necessary to establish training and certification systems for their own workers.

In the mid-1980s, approximately two-thirds of the budget of the Ministry of Labor was devoted to the support of public vocational training facilities for use by both public and private training programs for workers and grants and loans to workers seeking further training (Dore and Sako, 1989). Approximately 15 percent was used for capacity building in firms and industry groups. However, this component is growing rapidly. Over three-fourths of the Ministry's budget was from the special accounts from the unemployment insurance system.

Skills Certification System

The overall Japanese workforce development system devotes considerable time and resources to defining and testing standards of competence for employed workers. As in other industrialized countries, the Japanese government plays a major role in regulating occupational competencies and practices to protect the public interest and promote overall economic growth and efficiency. What is unique about the Japanese approach is the wider interpretation for public interest (e.g., energy conservation), the predominant role of government and employer organizations as opposed to professional associations and educational institutions, and the self-conscious use of skill standards and certification as a catalyst for private sector training (Dore and Osaka: 1989). The Ministry of Labor's trade test system is the largest government-sponsored skill testing and certification system in Japan. It is complemented by other government-sponsored testing and certification systems for occupational licensing and regulation and qualifications systems for government employment. Almost two-thirds of all government-sponsored skill testing and certification is designed to promote higher levels of occupational performance for employed workers, rather than restricting professional practice and protecting professional recognitions (Dore and Sako, 1989). There is little interest in using skill standards and certification to improve the functioning of external labor markets and the marketability and mobility of experienced workers.

An Overview of the Ministry of Labor's Trade Testing System

The Ministry of Labor's Trade Testing System is a national system of skill certificate examinations that is administered according to the legal provisions of the Human Resource Development Promotion Law. The major purpose of this system originally was to raise the social status of blue-collar workers by giving social recognition to the skills required in rapidly expanding manufacturing industries. The certificate examination system is administered by the Ministry of Labor through and private organizations including Prefectural governments.

The Ministry of Labor develops and administers monograde and Grade 1 examinations nationally and provides national certificates. The Prefectural governments develop and administer Grade 2

examinations (based on national standards) and provide their own certificates to Grade 2 workers. As discussed earlier, the content of the training standards (which determine the content of the examinations) are determined in the expert subcommittees of the Central Human Resource Development Council. The development of national monograde and Grade 1 examinations are done by the expert committees of the Japan Vocational Ability Development Association; prefectural Grade 2 examinations are developed by the Prefectural Associations of Vocational Ability Development (See Figure 9). The national and prefectural examinations are conducted by expert committees of the Prefectural Associations of Vocational Ability Development. The national and prefectural examinations consist of both a written test on related knowledge and laws and regulations and a practical test in which workers must demonstrate their skills through work performances. The practical components (i.e., work performances) are usually conducted in the publicly-funded vocational training centers administered by the prefectural governments.

In the Ministry of Labor's trade test system, workers are able to apply for examinations based on their previous education and training and previous work experience. A certain number of years experience is required for each trade test. These required years are shortened for training in approved national courses and general educational background. Workers who successfully complete an accredited program are many times exempted from the written examination.

Financing the System

The Ministry of Labor finances this national trade test system through two type of private resources: (a) funds from the special accounts of the unemployment insurance system, and (b) test-taking fees that are paid by workers and their employers. Approximately $667 million is spent on the central administration and support for prefectural governments. An additional $90 million is spent on the promotion of company-based skill testing systems and the promotion of skill competitions.

Defining Boundaries for Skill Certification

As shown in Appendices most authorized courses and certifications do not address broadly defined occupations, as in Germany, but more narrowly defined skills or skill sets. This reflects how the Japanese labor market is structured with workers identifying more with the company than with a trade or profession (Dore and Sako, 1991). For example, the Japanese trade testing system does not promote the identification of workers as "welders," but as company employees who have jobs that require welding.

Unlike Germany, certificates do not necessarily entitle workers to increased wages and earnings. Although some employers provide financial incentives to workers for seeking advanced certification, the national certificates are usually taken for social status and recognition of skills among workers and employers interests in promoting quality and efficiency in the workplace. Although some workers take certifications seek better employment opportunities or improve their chances of becoming reemployed if they lose their current jobs (especially with small employers), most workers seek certification at their employer's suggestion and encouragement because of government requirements (e.g., licensing, energy

conservation) or because their customer or other external industry association encourages the employer to have certified skilled workers to demonstrate company commitment to high quality and performance.

Extent of Coverage

Although the system started with only five job examinations in 1959, the system has rapidly expanded into skill certificate examinations for over 134 job types at the special, Grade 1, Grade 2, and monograde levels (See Appendix B). From 1959 to 1984, almost 3 million applicants were given skill certificate examinations mostly in Grade 1 and Grade 2 job types (Ishikawa, 1989). The largest number of certified workers are in the construction and metalworking trades (Ishikawa, 1987).

Most workers who take these trade tests in Japan have completed largely privately-financed, non-institutional training from employers, trade associations, and correspondence courses. The Tokyo Vocational Ability Development Association estimates that only about 15 percent of all test-takers were trained in public vocational schools. Twenty-one percent had receive related training in secondary vocational schools. The remaining received their training through some type of formal or informal private sector training program or work experience (Dore and Sako, 1989).

In addition to this publicly administered system, the Ministry of Labor also promotes and recognizes certification systems operated by industry and trade associations and large employers. The Ministry of Labor authorizes many industry and trade associations to maintain their own examination and certification systems. The Ministry also encourages large employers to develop and maintain their own internal certification systems. As part of the Capacity Development Program, employers and industry associations can receive grants to develop and administer testing and certification systems for their trainees. Sometimes large employers and their suppliers cooperate in administering joint skill testing and certification system. These capacity development grants are intended to promote worker skill development and recognition.

CHAPTER IV
THE COMPREHENSIVE MODELS

A. INTRODUCTION

Clearly the most ambitious and, perhaps radical, of the skill standards systems can be found in English speaking countries within the United Kingdom and the Commonwealth member state, Australia.

In both instances, prior to the 1980s the traditional role of the central government could be characterized as laissez faire in the arena of promotion of skill standards. During this past decade, however, there has been a dramatic shift. In these countries the promulgation of skill standards and certification systems are viewed as central to the competitiveness strategy of the overall economies.

As will be seen the development of the industry-driven skill standard systems are having direct impact on the organization and structure of vocational preparation institutions. Also, the traditional academic education systems are experiencing changes due to the establishment of the skill standards systems.

A sidebar, but nonetheless, important observation is that both countries have included in the development of the skill standards a health and safety requirements as well as environmental consideration.

B. AUSTRALIA

Context

The development of national competency standards in Australia is a relatively recent event. It is one of the key components of an ambitious effort on the part of the central government to substantially enhance the economic competitiveness of the nation. A wide-range of indicators and studies at the beginning of the 1980s showed the country was losing ground in the international marketplace as well as within its own internal labor markets. Enhancing the skills capacity of the emerging and current workers was deemed essential.

There have been a series of efforts to overcome the identified deficiencies. Initiatives included in the overall strategy are: establishment of a levy/grant training scheme that is designed to encourage employers to expend at least 1% of their total payroll on training for the workforce; the tax is not paid if the company can show proof that monies have been spent on training. If the business does not provide the training the tax is paid to the central government and the funds are used to provide training. The logic of this scheme is to help level the playing field between employers and encourage employers to overcome the weak history of worksite training in the country.

Another part of the overarching effort was to consolidate a wide range of federal Departments, Boards and Commissions into the Department of Employment, Education and Training (DEET) in the mid 1980s. Several of the states and territories within the country have followed suit since that time and consolidated their own governance systems.

DEET has a National Advisory Board that provides a consultation "framework" for the different components of the Department. There are sub-councils that work through the National Advisory Board, one is called the Employment and Skills Council which has within its purview issues concerning the training and vocational education system at the national and sub-national levels.

In 1991, one of the advisory councils, the Australian Education Council Review Committee issued a report that was on entitled Young People's Participation in Post-Compulsory Education and Training. The report sets targets and measurements through a national goal that promulgates that 95% of 19 year olds will have completed 12 years of schooling or initial post-school qualification or be participating in formally recognized education and training activities.

The report identified curriculum principles and key competencies and made the recommendation that national standards be developed for these key competencies. There was general agreement that schools need to become more concerned with the issues of employability and broad vocational training, that traditional vocational education needed to be concerned with competencies that are more general than the traditional craft-based apprenticeships, and the industries needed to be more active in the development and support of training which is better integrated with employment opportunities.

Industries are to be involved in the definition and development of key competencies for the schools in the areas of language and communication, math, science and technological understanding, cultural understanding, problem solving, and the desired personal and interpersonal characteristics.

This is just one more example of how yet another country is attempting to improve the transition from school-to-work within a common framework. In Australia, they have established the framework and they are now filling in the details.

There is a covenant that now exists between Federal and State and Territorial Governments to stimulate industry to formalize and specify its particular training needs in order to ensure that Australian products and Australian labor remain internationally competitive in markets, materials, technologies and the labor force and industrial processes. The idea is to create systematic, structured change in the way training is provided through carefully planned and orchestrated procedures for identifying and specifying to worker competencies needed at different levels in the workforce.

One key part of the covenant of the 1980s' was the launching of an industry-led skills standards system.

Overview of Skills Standards System

The overall initiative was based on the understanding that within Australian industries there was under-investment in human capital. Further, industries (whether from labor or management perspectives)

have not been fully responsive in informing vocational education exactly what they needed in terms of skilled labor. In addition, the standards effort is predicated on the recognition that before 1990, the Federal, State and Territorial Governments in Australia did not speak with a single voice about the need for either industrial or training policy. Further, the initiative recognizes that vocational education within Australia has been very slow to change. It has been focused more on the educators' perceptions of their own internal needs than on the needs of industry at large.

Therefore, the effort in Australia was to create a system of national standards that would provide at least the following outcomes:

1. Provide for a National Vocational Training System with clear mandates about the type of skills that the individuals coming through that system would have.
2. Provide clearly delineated career paths for workers, both within specific industries and to move from industry-to-industry by possessing transferable skills.
3. The system would provide flexible means to achieve at least the following:

    (a) Frequent industry review of the training standards;
    (b) The standards themselves would be referred to in the language of collective bargaining agreements and other similar documents but would not be specifically incorporated into those documents;
    (c) The standards are usable regardless of the size of the company, or the type of industry or the technology that was involved in doing the work;
    (d) Insure that there will be no limitations on access to the system, based either on race or gender; and
    (e) Through the National Office of Overseas Skills Recognition, that the specific skills and competencies needed, not only in industry, manufacturing, blue collar and management type jobs, but also in the professions, will be addressed comprehensively.

Partners, Management and Governance Systems

Perhaps one of the most important components of the Australian system is the National Training Board (NTB). The NTB is organized much like a company, and is an incorporated entity established by the Commonwealth, State, and Territorial Governments. It functions with a tripartite board of directors, (management, labor, and government.) It draws its fiscal support from funds allocated from the federal government as well as from each state and territory.

A bit of background regarding how Australia's governance systems work helps to explain why the NTB board was organized along the lines of an independent company.

There are two primary intergovernmental governance/arrangement mechanisms used to establish the frameworks for the operation of programs and services in the country. The first is modeled after a

section in the U.S. Constitution that allows for states to enter into inter-state compacts whereby each state agrees to subjugate its own legislative prerogatives to the inter-state compact. In Australia this model often includes the federal government. What will often occur is that the federal government will pass a piece of enabling legislation and then each state and territory will do the same. This can be a time consuming process. The second model reflects the NTB model, whereby, the two levels of government reach concurrence on the thrust of a particular initiative and then a quasi-governmental organization is created to carry out the mutually agreed upon tasks. This approach is followed when the topical area is clearly an emergent one and the precise frameworks have yet to evolve.

In 1990, a discussion paper was circulated throughout the country developed by the NTB. That discussion led to the formalization of agreements and responsibilities within the country and ultimately to the development of skills standards within a number of industries and continuing work in other industries.

To some extent the roles and responsibilities of the Australian system are still developing as the system moves toward full implementation. The NTB provides the structure for:

1. A consistent national framework for developing competency standards by industrial parties based on industrial needs.
2. Acceptance by all governments and training authorities of competency standards ratified by the Board as the benchmarks for vocational education, curriculum development, industry training and recognition and the delivery and accreditation of training, and
3. Competency standards endorsed by the Board to be benchmarks for recognition of skills and qualifications of those trained overseas.

Specific responsibilities of the National Training Board include the following activities:

- Establish a common language and format for the construction of competency standards for all industries and training providers;
- Provide technical assistance to industries in their efforts to develop standards;
- Receive, review and recognize standards as prepared by and submitted by industries within the country;
- Work with specific educational boards and other agencies such as the Registrar of Australian tertiary education, higher education, and technical and further education to develop an appropriate relationship between competency standards, vocational education and qualifications;*
- Monitor the training certification and accreditation activities of those working within the system.
- Insist upon and assist industries in conducting continuing reviews of their standards and their particular needs assessments;
- Help mediate disagreements that may arise among governments or among organizations involved in the entire national standards process;

▸ And perhaps most importantly, evaluate and recognize specific industry groups which then become the official spokes-organization and standards setter for that entire industry. Without the formal recognition of the National Training Board no group can create and promulgate standards for any portion of any industry within the country. The National Training Board is responsible for encouraging and demanding that any group representing itself as the industry association for setting standards has included within that group appropriate representatives from all parties that are part of that industry;

* The technical and further education component of the education system grew out of the formal apprenticeship system as well as the post-compulsory schooling vocational education system. It is roughly equivalent to the U.S. community college system.

The role of government within the Australian system includes several components.

▸ Governmental agencies at the state territorial level are charged with reviewing, monitoring and accrediting specific training and training providers;

▸ State and territorial governments through the education agencies themselves are charged with providing training to workers either prior to employment or once employed. In that capacity, the educational system is charged with serving as a service provider to industry in order to ensure that workers have the specific competencies that are required by that specific industry;

▸ Private training providers are subject to the monitoring and accreditation of government agencies; and,

▸ Educational providers must not only provide direct services, but must, with the assistance of industry, develop an appropriate curriculum to ensure that individuals gain the competencies that are required within the framework of the standards.

Industry, which includes both management and labor within this broad definition, is responsible for:

▸ Setting the standards;

▸ Providing for assessment where appropriate;

▸ Providing for certification of individual skills; and

▸ Continuing review of standards, once they are established, in a timely and regular basis. This review is expected to take into account, international developments in terms of the labor market, technologies, materials, and products.

In many situations industry also assists or develops curriculum and actually provides training along with the educational system.

Furthermore, industry is expected to incorporate (by reference only) the standards into collective bargaining agreements and more specifically, pay scales so that compensation is related directly to the job that someone does. This is based on the meritorcratic idea of pay for knowledge and skills. This point is

of particular note because Australia has national wage agreements and as a part of the legislative framework for the wage agreements both the unions and employers must agree to participate in the establishment of skill standards.

The Framework of the System

The Australian system shares a common language where terms such as competency, accreditation and training delivery are defined specifically for everyone involved in the system. Definitions of some of the more important terms follow:

1. Competency Standards -- Competency Standards reflect the knowledge and skills and the application of that knowledge and skills to a standard of performance required in employment.
2. Training and Curriculum Development -- Includes the preparation of training objectives, curricula and training programs based upon whatever is needed to achieve the competency standards.
3. Accreditation -- Is the process of granting official approval to curricula and training programs.
4. Training Delivery -- Is the approval of specific training provided by public and private sectors, but approved by State and Territorial Governments.
5. Assessment -- Is the process of judging competency against prescribed standards of performance.
6. Certification -- Is the provision of formal recognition that competency has been achieved and demonstrated.
7. Monitoring and Verification -- Are the quality assurance process involving internal, and local and external validation to ensure that vocational training meets national competency standards.
8. Review -- Is the process of continuing renewal within the system.

The overall system is based on a formal policy as developed and promulgated by the NTB. Eight principles constitute the foundation of that policy. Those principles are as follows:

1. National competency standards for occupations and industry classification are developed and endorsed within a formal framework.
2. Core competency standards for occupations and for industries must have board applicability across industries in Australia.
3. Standards must define performance outcomes required by industrial parties; be delivered by training providers; and be assessable in practice.
4. Standards are expressed in a manner that is consistent and could be understood in the workplace and training environment.
5. Standard systems must include review and monitoring mechanisms.

6. Standards must not inhibit or limit access by individuals on the basis of age, gender, social or educational background.
7. Standards must be approved on a full or provisional basis depending on the extent to which the industry has satisfied the National Training Board that the standards are sound, that training delivery and accreditation is obtainable and that assessment is provided on a nationally consistent basis.
8. The National Training Board will work in partnership with industry and training authorities to achieve common objectives.

In general, any industry standards group is charged with thinking about two types of standards across a number of different levels. One type of standard is termed "occupational core standards," and includes broad-based competencies that must be achieved by all persons in an occupation regardless of their particular job. These competencies include abilities in numeracy, literacy, occupational health and safety and communication within the occupational context. In addition, these competencies may include some broad technical competencies that are necessary for the occupation.

In addition to the occupational core of standards, there are also industrial core standards that are technical and broad-based and must be mastered for a person to work effectively in a particular industry or industrial sector. Often these standards include the specific knowledge and skills that someone must master in order to work in specialized areas. These industry core standards within specialized areas may have less transferability then do the broad occupational core standards or the basic industry core standards.

Competency Levels

The NTB has established eight competency levels which serve as reference points for the development and recognition of competency standards. Vocational training and qualifications may be compared by using these competency levels; however, they are not intended to serve as comparisons of skill or compensation across industries.

Each of the competency levels describes the total competency required at that level. Between entry to and final achievement of a particular level, there usually are a number of gradations of competency. This is particularly true for level one which may commence with induction and culminate when a person has achieved sufficient competencies to be deemed a competent operative in a particular job. The level one competencies are the most basic within an industry, and the level eight competencies are the most sophisticated within a particular industry.

- Level 1 competencies mean that a person has an established work orientation and the knowledge and skills required to perform routine, predictable, repetitive, proceduralized tasks involving limited, theoretical knowledge and motor skills while working under close supervision.

Preparation for employment at level one is generally obtained through job specific training mainly in the workplace.

▸ Level 2 competencies mean that a person has an established work orientation and the knowledge, skills and demonstrated capacity to perform proceduralized tasks under general supervision and more complex tasks involving the use of theoretical knowledge and motor skills under close supervision. Preparation for level two employment is generally obtained through job specific or general training which may be certified by appropriate authorities. Level two training typically might include an apprentice worker within many industries.

▸ Level 3 competencies mean that a person has an established work orientation and the knowledge, skills and demonstrated capacity for self directed application including the selection and use of appropriate techniques and equipment required to perform tasks of some complexity and involving applied theoretical knowledge and motor skills. This level corresponds to a competent, skilled, autonomous worker. The training required to achieved this level is the training provided through educational and training institutions that might lead to a trade certificate or its equivalent in a non-trade occupation. In many industries, a journeyman would fall into this category.

▸ Level 4 competencies mean that a person has highly developed skills, knowledge, or capacity for self directed application, including the use of appropriate techniques and equipment required to perform highly complex tasks involving substantial applied theoretical knowledge and motor skills. Many of the complex tasks would be performed without supervision, and may include supervising the work of others. This category includes advanced skilled, autonomous worker and training for this category would include education and training opportunities that would lead to an initial, post-trade, or equivalent certificate or an advanced certificate.

▸ Level 5 competencies mean that a person has an established work orientation, and knowledge, skills, and demonstrated capacity for self-directed application required to perform tasks involving independent use of a high degree of technical or implied theoretical knowledge, possibly in combination with developed motor skills. This level of work entails limited creative planning, design and supervisory functions and typically includes competent administrators or specialist technicians or para-professionals. The training available for this level of competency is formal education that would lead to an associate diploma or a diploma.

▸Level 6 competencies meant that a person has a developed capacity to make autonomous use of a high degree of applied theoretical knowledge in combination with mastery of the theoretical

bases of that applied knowledge. Tasks may require developed motor skills and significant creative, planning, designing or supervisory functions related to products, services, operations, or processes. This level corresponds to a competent senior administrator, specialist, technologist or paraprofessional. Current courses of formal vocational education and training available to assist in preparing for employment at this level generally are those leading to an associate diploma or a diploma. In some cases, a degree may apply.

▸Level 7 competencies meant that a person are in the realm of professional expertise. A person is to have a highly developed capacity to make autonomous use of high level theoretical and applied knowledge. The task may require developed motor skills, and may include high degrees of creative planning, design or management. Further, the competencies often will have substantial degrees of accountability and responsibility for the output of others. The level corresponds to that of a competent professional or manager. Typically, the formal education training available to assist in preparing for employment at this level are courses that lead to a degree (either undergraduate or graduate).

▸ Level 8 competencies mean that a person has highly developed capacities to generate and use advanced levels of theoretical and applied knowledge. The tasks often require highly developed motor skills and the ability to undertake complex and major creative planning, design and managerial functions with full personal accountability and responsibility for the output of others. This level corresponds to a competent senior professional or a manager. The formal education and training necessary at this level of employment include content leading to higher degrees. Professional qualifications also may include post doctoral research, evidence of publications and contribution to advancing knowledge in particular areas.

One of the basic ideas in creating this framework for competencies is to relate transferrable skills across industries to enable workers to be more portable and to expand their horizons for employment opportunities. In addition, the levels of competency and specification of competencies allow the elaboration of career paths within industries so that workers can set goals and work to achieve their own individual goals within any particular industry. A third benefit of specifying the skill levels is to assist industries in setting compensation rates so that employees earn according to what they know and can accomplish within a particular industrial situation. A fourth benefit is that the standards framework allows industries, educators and others to coordinate levels within the standards framework and qualifications and certifications as gained through educational opportunities so that there is correspondence between earning a degree and acquiring the types of competencies that are required for working at various levels within the overall framework.

Standards Setting Process

Competency standards are determined by analyzing workplace needs and defining competencies required in employment situations within the framework established by the National Training Board. The analysis focuses on what is expected of an employee in terms of performance, not the learning process; further it encompasses the ability to transfer skills to new environments. Therefore, the analysis deals with performing individual tasks, managing a number of tasks on the job, responding to irregularities and breakdowns in routine, and dealing with responsibilities and expectations of a broader work environment. There are three types of standards:

- Industry standards
- Cross-Industry Standards
- Enterprise Standards

The first two are self-explanatory but the latter, enterprise standards, deserves some discussion. There are a substantial number of privately owned companies in the country, some dominating their industries. Many of these enterprises felt that trade secrets might be given away to their competitors if skill requirements were to be made widely known. In order to assure the total system remained responsive, the NTB established a policy that allows the establishment of voluntary enterprise standards.

The standard setting process in Australia is conducted by an industry group authorized by the National Training Board. Currently there are approximately 70 such recognized groups. Over time there is the objective to reduce this number somewhat.

Each industry group is, by necessity, made up of employers and labor, and must encompass all entities that work within the industry within the country. The work of an industry group is required to begin with extensive and formalized occupational analysis. While the National Training Board will not prescribe, nor favor any particular analysis technique, it does recommend the use of interviews, critical incident methods, surveys, DACOM, CODAP and other formal occupational analysis procedures.

The National Training Board requires a formal procedure that is applicable and appropriate to the industry being used. Further, they require that whatever technique is used, it may not discriminate against any particular group within the workforce.

As the industry undertakes its analysis and specification of competencies, the National Training Board provides technical assistance and definition so that all competencies are specified in the same format. As indicated earlier, competency focuses on what is expected of an employee in the workplace and deals not only with individual activities, but also with managing tasks, irregularities, and the workplace context.

Competencies must be expressed as outcomes, must be realistic to the work that people actually do, and must be understandable to trainers, supervisors, potential employees and everyone else involved in the system.

When an industry has completed its analysis of need and specification of competencies it submits this information to the National Training Board. Also submitted at that time are the industry plans for training delivery, for recognizing prior learning, for assessment and certification, for review of the standards and for whatever steps have been taken to insure non-discrimination. In addition, industry must provide evidence that all interested parties have been consulted including other industries, State and Territorial governments and training authorities who may need to provide resources. In addition, the areas of continuing difficulty that require resolution must be specified.

The information is considered by the National Training Board and a decision is rendered within a month. It then becomes the charge of the industries, the State and Territorial Governments and the educational system to implement the program.

Assessment Related Issues

A key issue regarding assessment had to be addressed early in the development of the system. For many of the industries and occupations there has been a great sensitivity to the issue of assuring that assessments are competency based with minimal reliance on literacy requirements in the assessments. While the unions have been supportive of the development of skills standards, they have also been concerned that long-term workers would not be able to pass paper and pencil tests that relied predominately upon literacy skills. For this reason and others, there is a requirement that performance assessments be included in the certifications.

Governmental training agencies have been deeply involved in this process and perform the assessment tasks for many of the firms. Their involvement in assessment has been driven both by their experience in doing performance assessment and by their
continuing involvement in the programs designed to teach the skills required by the standards.

Extent of Coverage

Given the limited resources (less than $2 million Australian per year) of the National Training Board, annual priorities for industries in which the Training Board will invest time and resources are established. To date, priorities have looked to achieve a balance across different types of occupations and industries in Australia.

Currently, the standards process is working in about 40 industries, including everything from aerospace to retail trades. Further, the process is expanding to include not only setting standards within industries and providing for certification of individual skills, but also to accredit the programs of training providers throughout the country.

C. UNITED KINGDOM

Context

By the beginning of the 1980s in the U.K. there was a growing consensus that substantial rethinking was required to improve the skills base of the population. There was a general agreement that just one more new federal grant program would not solve the skill shortage problem the country was facing. There were a range of reports and stacks of statistics "proving" that the education and training system was a fractured system of provider-led programs that were not perceived to be adequate to meet the needs of the new economy.

The United Kingdom's entrance into the arena of establishing a national system of skills standards grew out of a national effort to rationalize both the education and training systems. Gilbert Jessup, the Director of Research, Development and Information, at the National Council for Vocational Qualifications (NCVQ) has provided a highly useful analysis of the rationale for a voluntary national qualifications "scheme" in his book, *Outcomes*. His chronicle of events that led up to the establishment of the National Council in 1986 and its work since that time provides a rich history of the nation's effort to radically redirect the entire "learning enterprise".

England, Wales and Northern Ireland are using the same processes and mechanisms to create skills standards systems. Scotland's approach, while significantly more centralized in some of the activities, pursues the same goals. (Note: Scotland's approach will not be dealt with in this paper.)

As Jessup points out, the current efforts to drive the entire education and training system through an outcomes based agenda has it roots in earlier efforts. One of the central government initiatives established in 1981, The New Training Initiative (NTI), included a set of programs for both young people and adults that still shared the same characteristics of the "old" training initiatives (e.g., highly categorical separate programs). However, in the NTI, the concept that training programs should be driven by "skill standards" was first introduced. The first objective of that NTI agenda said:

> ... we must develop skill training including apprenticeship in such a way as to enable young people entering at different ages and with different educational attainments to acquire agreed standards of skill appropriate to the jobs available and to provide them with a progression through further learning.

Furthermore that report went on to say that standards needed to be:

- explicit: so that firms and individuals know what they are and where information about them can be obtained;
- agreed: so that there can be no doubt about them and their standing;
- widely accessible: to young people and adults;
- flexible: in response to changing, and sometimes different, needs of individuals and localities through a variety of forms of provision (e.g., education, full-time and part-time training);

- progressive: so that people with a portfolio of skills, knowledge and experience can build upon that as they seek to adapt to technological and market changes, to improve their prospects or to explore their potential; and,
- testable: so that they embody an agreed, appropriate and common standard of training achievement which can be certified as such.(Jessup:1991)

Much has been learned since 1981 in the U.K. regarding the development and implementation of a skill standards system but it appears as though the basic framework that was envisioned at that time has endured the test of time and has helped shape reform of both the education and the training systems.

During the past decade the central government has both decentralized and deregulated the employment and training programs. Training and Enterprise Councils (TECs) have been established in local labor market areas charged with the responsibility to promote business enterprise development as well as organize and deliver training for both youth and adults through the most cost effective means possible. The central government after consultation with the TECS and others sets annual targets; and local TECs are evaluated against those targets.

The national targets for 1993-94 appeared in a joint guidance from the Secretary of State for Employment and the President of the Board of Trade. There were 6 national priorities agreed upon and five of them used the development and expansion of the National Vocational Qualifications (NVQ) as a core strategy. The clear push is to increase the number of individuals involved in continuous training, to expand learning opportunities, and to document the individual's knowledge gained and skills acquired during the course of education and training.

The NVQ's are viewed as an "equalizer" for the individual, an economic imperative for the firms and the quality assurance/ public accountability mechanism for the government's training programs. The standards are also viewed as one of the most important weapons in the arsenal of educational change -- starting first with the compulsory education levels but including the post secondary system as well.

The Educaton System's Use of Standards

In the United Kingdom there has been a radical shift in the organization of the compulsory education system. Historically the system had been one of the least centralized in Europe. Local control of the system had been a tradition for over 100 years with a strong head teacher role reporting to the Local Education Agency (LEA). In 1988 the Education Reform Act diminished the role of the LEA by giving increased autonomy to the local schools and a board of governors that must include parents, local businesses, and other community representatives. At the same time that budget and hiring authority were being decentralized, curriculum was centralized.

The Department of Education and Science (DES) absorbed the responsibility for developing a National Curriculum as well as developing a mandated testing system that are now covers 7, 11 and 16 year-olds. The National Curriculum is comprised of 10 foundation subjects including 3 core subjects

(English, Mathematics and Science). The curriculum is geared towards "statements of attainment" or outcomes. A portion of the assessment of students is to be based upon criterion-referenced standard assessment tasks (SATs) developed by a Schools Examination and Assessment Council (SEAC) which is to consult with a wide range of interested parties in the development of school based learning assessment instruments. One of the organizations that SEAC and the DES must consult with is the NCVQ that has the responsibility for the effort to establish National Vocational Qualifications (NVQ).

The NVQs form the heart of the UK's skills standards system and several aspects of the NVQ's will be discussed in greater detail below. However an example of how the two major reform efforts converge bears mentioning.

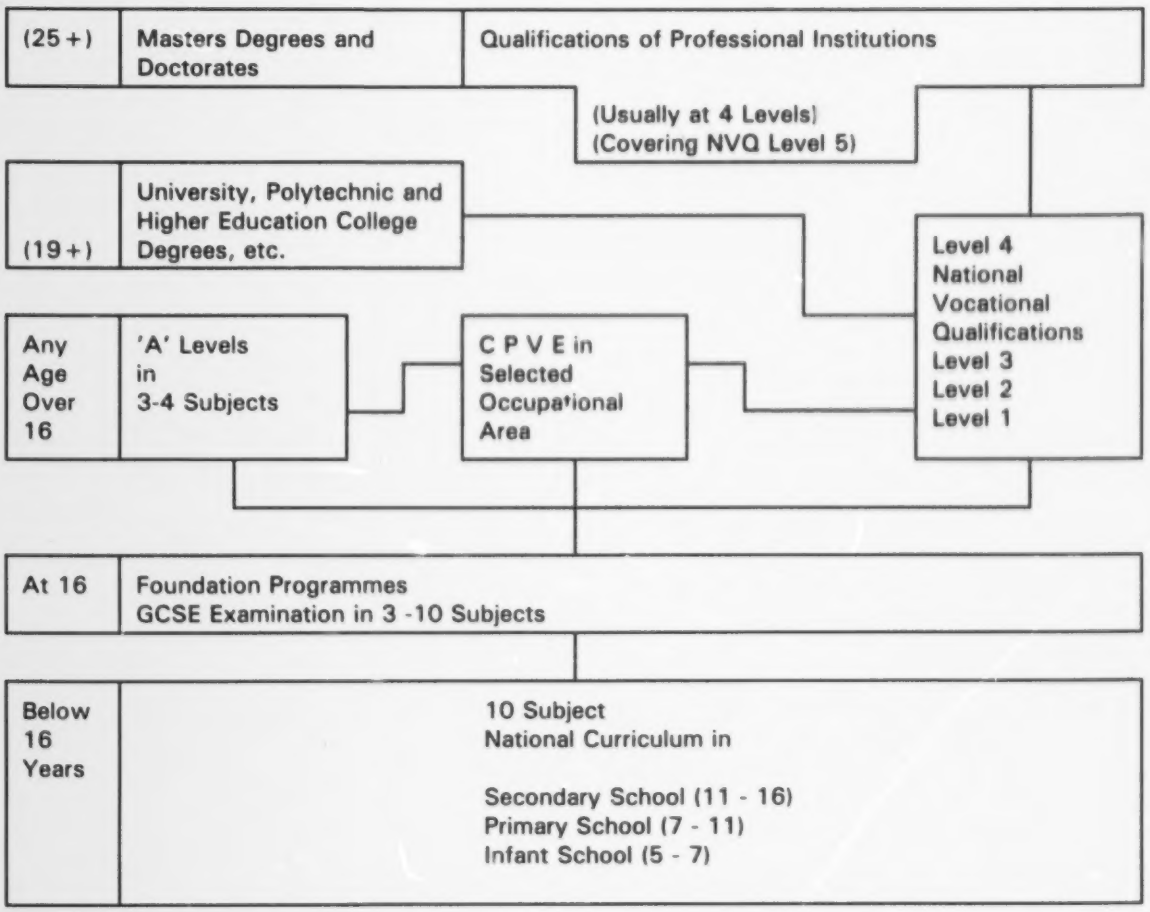
In the UK external third party groups have long been responsible for the examinations given at the end of the compulsory schooling. Popularly called the "O" and "A" level exams (normally taken at ages 16 and 18), these are "high-stakes" tests because they determine access to polytechnics, colleges and universities. One of the education reform issues has been how to create additional access avenues to further education. The NVQ's have provided a partial answer to the access question as can be seen in Figure 10.

There is a recognition that it is necessary to substantially increase the post-16 participation rates in education. There is an effort led by the Education Secretary to establish General National Vocational Qualifications (GNVQ) which can be taught and assessed through full-time education. The intent is to have a practical competence test like the NVQs and also include a test of academic ability. Currently there are several pilot efforts underway to test curriculum, assessment and student interest in the art and design, business studies, health and social care, leisure and tourism and manufacturing areas. According to popular press reports student interest has been very positive and in general the new GNVQs are gaining acceptance.

It is believed by many in the government that the expansion of GNVQ may help to increase the participation rates at the post secondary education level and at the same time force some changes in the more traditional "A" level examinations that have come under attack by the central government in recent years.

One of the issues that has caused some controversy in England has been whether or not it is possible to develop examinations that have the "parity of esteem" between the academic and technical/vocational qualifying exams. Math is a particularly contentious subject on this question of comparable content and value. Several studies have been done in Scotland as well as England regarding the issue of how math is taught and indeed -- if it really is taught -- in most of the vocational track programs. It is recognized in all the UK countries that it will be necessary to improve the form - as well as the substance - of mathematical preparation.

Figure #10
The United Kingdom Education Pathways



Foundation Programmes	--	a 14-16 programme offered by the Board for Pre-Vocational Education
GCSE	--	General Certificate for Secondary Education
	--	entry to 'A' levels, vocational education
	--	supplementary to 'A' Level requirements for matriculation
NVQ	--	National Vocational Qualifications are the certificates of Awarding Bodies
CPVE	--	Vocational orientation and initial technical education (Certificate of Pre-Vocational Education)
'A' Levels	--	University, Polytechnic or professional matriculation
Professional Institutions	--	usually Fellowships, Memberships, Associateships, Licentiateships or Graduate awards

Source: City and Guilds of London Institute, London (1991). Certification Practices in the European Community.

At the central government level the Secretary of State for Employment has the lead responsibility for supporting the development and expansion of the NVQs and setting national targets to increase the participation in post-16 education. The Department of Education has the lead responsibility for helping develop the new GNVQs within the general framework of the NVQs.

It is not surprising that some confusion regarding the role of the two Departments has emerged as the development of the national standards and curriculum have evolved. The Confederation for British Industry and other organizations are on record to merge the two Departments but at this time the central government, unlike Australia, is resisting such a merger and insisting such a radical step is unnecessary.

Partners, Management and Governance Structure

The NCVQ, that covers England, Wales, and Northern Ireland was formally established in 1986. It is an independent body that has no legal power and therefore must rely upon the power of persuasion and the commitment of the central government to promote the NVQ's.

The NCVQ's responsibilities include:

- design of the overall framework of qualifications;
- accreditation of the organizations (called Industry Lead Bodies) that develop the qualifications;
- accreditation of the Awarding Bodies which design and award the qualifications and insure the quality control of assessment; and
- promotion of the standards to employers and candidates.

The accreditation is to be reviewed every 5 years.

The appointments to the 13 member Board of the Council are made by the Government. In 1992, 8 appointees were industry representatives, 3 were from education, 1 was a retired trade unionist and 1 a professional association representative (Peretz:1992).

The NCVQ has a small staff of 58 people of whom about one half focus on the accreditation tasks and the remainder on research and development of databases. It charges for a range of services including receiving royalties from the Awarding Bodies and it is approaching one half of its budget from such sources. The remaining monies are provided by the government through the Training Agency.

Access to Information

There are two important national databases managed by NCVQ. The first is the data base of Vocational Qualifications that contains the full range of information about the NVQs as well as other major qualification (certification) systems. The second data base is the National Record. This information system has the individual records of all the people that have participated in the NVQ assessment process. It includes a personal record, an individual action plan, an assessment record and the "growing" certificate file that shows the NVQs or other qualification records.

The government's responsibility for the NVCQ, in addition to fiscal support, is to promote standards development. For example all government funded training programs enrollees are required to

take NVQs if available. Serious consideration is being given to useing the power to require that any educational institution receiving government funds use only NVQs. Presumedly this means the inclusion of the aforementioned GNVQs as well, thereby eventually making the skill standards an all pervasive driver of both the education and training system.

The Training Agency has also provided development support (up to one half of the costs) to the Industry Lead Bodies (discussed below), as well as development of substantial information resources regarding assessment technologies and other topical issues.

Industry Lead Bodies

The Industry Lead Bodies (ILB) have the task of specifying the standards for the NVQs and the attendant training. Approximately 150 ILBs have been recognized by the NCVQ through 1992. It is recognized that this number is too large and by the mid 1990s it is expected consolidation will occur.

The ILBs are supported by funding from the Training Agency that ranges from partial to full funding. The ILBs are a replacement of Industry Training Boards that had been established by the then Labour Government in 1964. The Industry Training Boards had responsibility for certification of skills but this had not been a high priority activity on the part of the central government. These older versions of boards had equal numbers of employers and trade union representatives plus a similar number of education and training representatives. The new boards generally have only one trade union representative serving in a personal capacity, yet the Trade Union Congress has supported the development of standards in principle and in practice. There was also a high degree of skepticism on the part of industries at the beginning but with the support and push from government the NVQs are gaining acceptance (Peretz 1992).

Given that the development and support for the ILBs pre-dated the establishment of the NCVQ and the development of the total system, it is not surprising that all of the pieces have not fit together perfectly. Jessup and others have recognized several problems with the ILBs role and its relationship to other parts of the system.

One of the most problematic areas has been trying to develop standards for occupational areas within poorly defined industrial sectors. Insufficient attention was given to the issue of how to deal with occupations that cross industry sector lines.

Originally there was also an insufficient amount of attention given to which classification system would "drive" the NVQ framework (see standards section below). This created additional confusion.

A partial answer to some of these issues has been to increasingly support the establishment of "generic" lead bodies to create standards in functional areas which cross sectors.

Awarding Bodies

Awarding Bodies (AB), also must be accredited by the NCVQ and 64 had been recognized by 1992. The core responsibilities of these bodies are:

- To exam and issue certificates of qualifications to candidates; and,
- To assure the validity and reliability of the assessment instruments that are used by them.

An Industry Lead Body can also be an Awarding Body but the NCVQ has separate accreditation criteria for the two functions. Those ILBs that also act as Awarding Bodies are normally focussed on a single industry (e.g., construction) or a professionally driven occupation such as engineering or accountancy.

ABs can and do perform different roles for different ILB's. Depending on the size of the ILBs, and the history of the industry and occupations of concern, ILBs may be of sufficient size and have the internal expertise to develop the standards internally. However in many cases contractual agreements will be developed with ABs for assistance with some portion of the standard setting exercise. In assessment, AB services can range from independently offering certification to providing administrative support for an ILB when it has been determined that most of the assessment must occur at the worksite.

The same NVQs can be offered by more than one AB and in some large clusters such as Business Administration, this is the case. Multiple avenues of access to assessment are apparently valued within the system on the basis that a larger population is more likely to avail themselves of the examinations. Also the modes of assessment can vary for the same Qualification (see section on assessment for further explanation.)

There has been a long history in the U.K. of independent third party assessments by organizations that have awarded certificates of qualifications. The Royal Society of Arts, the Business, Education and Technical Council, and the City and Guilds are all examples of national organizations that have been long associated with the awarding of workplace related credentials.

An example of how one these organizations dealt with the transition to Awarding Body follows. In 1991, the City and Guilds had been responsible for accrediting about 50 percent of the total NVQs awarded. (C&G, like the other well established ABs continue to provide separate certifications of competencies that do not fit within the NVQ framework; however, as more NVQs are developed C&G is melding the certifications together. C&G works with 70 of the ILBs.)

C&G was established in 1878 and financed then by the City of London and its Livery Companies. It has a Royal Charter and the Duke of Edinburgh, Prince Philip serves as its President. It is a non-profit organization that does not seek or receive any direct subsidies from government. It currently provides services in some 70 counties, now including a U.S. base to develop a market in North America.

Conversations with City and Guild officials revealed that at the time the idea of a NVQ system was initially being discussed there was a lack of support inside the institution and the industry networks with which they worked. According to these officials the concerns revolved around government intrusion and possible upset of the comfortable working relationships that had evolved over the years.

C&G had already established a classifications system to recognize qualifications from novice to high level management and were not anxious to change. The fears have apparently dissipated but the organization has remained firm in remaining financially independent of government subsidies.

C&G has several subunits that all contribute to the national skills development infrastructure. It has standing committees of industry representatives that help develop the assessments; it has the lead responsibility for the UK's participation in the international Skill Olympics and in 1991 C&G was asked by

the Secretary of Education to establish a separate Board and Institute to develop the programs that combine vocational and academic programs suitable for 14-19 years old students of all abilities in schools and colleges. The key feature of the effort is to develop the logical progression to higher level courses and awards discussed earlier under the discussion of National Curriculum and parity of esteem et.al.

Standards and the Standards Setting Process

The U.K. system has dropped the use of the word standard as the primary descriptor of the national qualification system. It has been replaced with the term competency. This classification system is based on employment functions -- not occupations or industries.

In the early 1980s when the effort first began the focus was on gaining agreement regarding the standard tasks to be performed on a job; however, work in Scotland pointed out this was too narrow of a base and the system needed to be built upon a set of modules that could be "accredited."

An NVQ is defined as:

- a statement of competence clearly relevant to work and intended to facilitate entry into, or progression in, employment and further learning, issued to an individual by a recognized awarding body.

The Qualification is derived from what employers and employees in the relevant industrial sector, occupation or profession deem to be required -- not from an analysis of curriculum or other education and training materials.

The statement of competence is to incorporate specified standards in:

- the ability to perform in a range of work related activities; and, the underpinning skills, knowledge and understanding required for performance in employment.

There is a requirement for a common format in the statement of competence that includes:

- the Title;
- breakout by Units;
- within the units listing of the Elements of Competence plus Performance Criteria for each element; and
- a Range Statement

The elements of competence are to include not just the technical requirements of jobs but are to incorporate the less tangible aspects of performance such as team work and problem solving. The heading of task management, contingency management, and role/environment skills are used to define these less tangible elements.

One of the critical reasons for the requirement of Units is to assure that individuals will have the opportunity to take separate assessments and receive unit credits within the national credit accumulation and transfer system.

All Elements of Competence are to include:

- an active verb;
- an object; and,
- a condition.

All Performance Criteria are to contain:

- a critical outcome (something that has to be done for the function described by the element); and,
- an evaluative statement that can be quantitative or qualitative.

The Range statement is to express the various circumstances in which the competence must be applied and could include physical locations or type of equipment. (See Figure 11 for an example).

Within this format an overarching framework of common levels has been established. Originally there were four levels and in 1990 a fifth level was added at the upper tier so that professional qualifications are now being incorporated into the NVQ. Level 3 presumes additional education or training past the compulsory school period. It is anticipated that the fifth level will require a broad body of knowledge and in order to qualify a higher education degree will be required.

The 5 Levels are guided by the following indicators (not prescriptions)

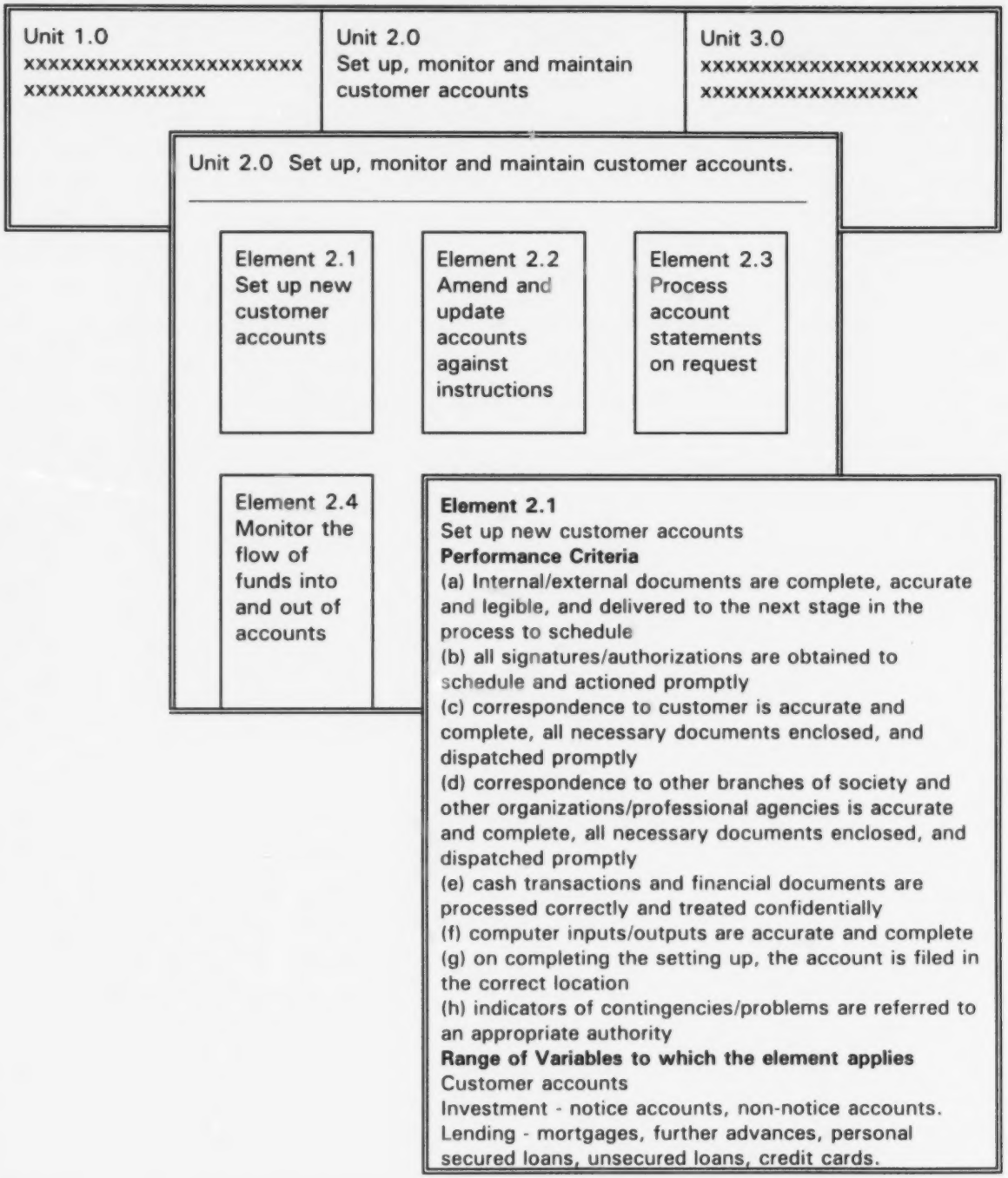
- Level 1 -- competence in the performance of varied work activities, most of which may be routine and predictable;
- Level 2 -- competence in a significant range of varied work activities, performed in a variety of contexts. Some of the activities are complex or non-routine, and there is some individual responsibility and autonomy;
- Level 3-- competence in broad range of varied work activities performed in a wide variety of contexts and most which are complex and non-routine. There is considerable responsibility and autonomy, and control or guidance of others is often required;
- Level 4 -- competence in a broad range of complex, technical, or professional work activities performed in a wide variety of contexts and a substantial degree of personal responsibility and autonomy. Responsibility for the work of others and allocation of resources is often present;
- Level 5 -- competence which involves the application of a significant range of fundamental principles and complex techniques across a wide and often unpredictable variety of contexts. Very substantial personal autonomy and often significant responsibility for the work of others and the allocation of substantial resources feature strongly, as do personal accountabilities for analysis and diagnosis, design, planning, execution and evaluation.

Not all occupations will require all 5 levels and NCVQ will decide on the final levels based on the advice from the ILBs and ABs.

Initially there was a substantial amount of criticism regarding the "difficulty index" of the levels, particularly levels 1 and 2. The operational reality appears to be that Levels 1 and 2 are being used as the base line in the development of the qualifications for the GCSE (General Certificate for Secondary Education.) The training programs appear to mainly target competencies at Levels 2 and 3.

Figure #11. Details of an element, performance criteria and range located within unit and VQ structure

Title. Financial Services (Building Societies)


Unit 1.0
xxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxx
Unit 2.0
Set up, monitor and maintain customer accounts
Unit 3.0
xxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxx
Unit 2.0 Set up, monitor and maintain customer accounts.
Element 2.1
Set up new customer accounts
Element 2.2
Amend and update accounts against instructions
Element 2.3
Process account statements on request
Element 2.4
Monitor the flow of funds into and out of accounts
Element 2.1
Set up new customer accounts
Performance Criteria
(a) Internal/external documents are complete, accurate and legible, and delivered to the next stage in the process to schedule
(b) all signatures/authorizations are obtained to schedule and actioned promptly
(c) correspondence to customer is accurate and complete, all necessary documents enclosed, and dispatched promptly
(d) correspondence to other branches of society and other organizations/professional agencies is accurate and complete, all necessary documents enclosed, and dispatched promptly
(e) cash transactions and financial documents are processed correctly and treated confidentially
(f) computer inputs/outputs are accurate and complete
(g) on completing the setting up, the account is filed in the correct location
(h) indicators of contingencies/problems are referred to an appropriate authority
Range of Variables to which the element applies
Customer accounts
Investment - notice accounts, non-notice accounts.
Lending - mortgages, further advances, personal secured loans, unsecured loans, credit cards.

Source: Employment Department Group (1991), Development of Assessable Standards for National Certification.

One of the national goals is to have at least 50% of the employed workforce qualified at the 3 level or its academic equivalent by the year 2000.

Assessment Related Issues

Candidates do not have to undergo any particular program of learning, the award is based solely on the outcome of the assessment. The forms of assessment can vary but must include a work-site component, most are a combination of paper and pencil tests and some form of performance assessment that may or may not be conducted at the actual worksite.

The NVQ can be awarded by a single body or a consortium of relevant bodies. If there is a consortium arrangement there must be a clear statement regarding the specific contributions of each body involved in the process. Those offering assessment services must show "proof of standing" with the appropriate employers and representatives of employees (including unions); assure the capacity for national coverage; have the capacity to perform a range of assessments (e.g., standard testing, performance assessments, work site evaluations); arrange for the credit accumulation and transfer files; and others.

In order to be accredited an AB must prove they have paid attention to a range of quality assurance issues. These include ensuring the competence of assessors; monitoring that assessments are operated in accordance with agreed upon procedures; commissioning outside evaluations; permitting NCVQ staff to attend meetings and training sessions; approving centers within which assessments occur and others.

The Employment Department and NCVQ have been concerned about a range of assessment issues. The NCVQ has issued a series of guidances regarding the processes and elements of good practices that are to be followed by the Awarding Bodies.

Having a requirement that all assessments use reliable and valid methods raises the question of how valid is valid enough ? In a 1992 study, Validating NVQ Assessment, Johnson and Blinkhorn try to answer this key question and others regarding the assessment processes used by the NVQs for the Department and the NCVQ.

Johnson and Blinkhorn make a key point regarding why the traditional literature and technical practice concerning reliability and validity have little relevance for the NVQ system. Most of the past work in the field has focused on educational and psychological testing with a view, for the most part, to prediction of later performance. Rather little of it has been focused on criterion-referenced assessment. Much of the traditional practice focuses on comparing people one with another.

The NVQs are absolute standards; they are their own criteria. Competent performance is defined as the ability to meet the performance standards captured in an NVQs performance criteria. Norm-referenced assessments are not appropriate. They recognize an inherent weakness exists in the NVQs because they provide a snapshot of competence at a given point in time. However,

Johnson and Blinkhorn do not view this as a fatal flaw because of the belief that if a competence has once been developed it is possible to regenerate it even if it not maintained.

The purpose of this report is not to examine the literature on the subject of test development and measurement issues but simply to note that the U.K. has invested a considerable amount of effort since the establishment of the NVQs on the topic that would merit review by U.S. officials as a voluntary skill standards system evolves.

Financing of the System

Total cost figures are not available regarding the development of the skills standards system. What is very clear is that a substantial amount of funds from the central government have been essential to put the system into place. There appears to be a coherent fiscal strategy that exists at the central government level between the education and training agencies to make the complex puzzle fit together.

Industry press materials clearly show that support from the central government has been the central reason for their participation. The publicly funded TECs and other training providers are expending funds to support the system for a variety of reasons -- not the least of which is the central governments decision to support only training programs that are geared to the NVQs.

There appears to be an implicit assumption that eventually the skills standards infrastructure will become largely self-sustaining. The NCVQ 's authority to charge royalty fees to Awarding Bodies and fees for the use of information in the data bases is an important feature. The ABs are able to generate income through charging public and private organizations, as well as individuals, for the assessment services. However, several sources have pointed out two substantial "soft spots". One is the cost for the individual companies working to document and validate competencies for the entry level workers. Said another way, there remains a question as to whether or not the ILBs are able "to deliver" the individual firms fiscal contributions for the entry level workers, including paying for the assessment of workers. The other fiscal soft spot again relates to the workplace -- the cost of workplace assessments. The key issue is a quality assurance one, the worksite assessors must have been sufficiently trained in assessment techniques in order for the AB to finally issue the certificate. During the initial implementation phase there were several newspaper reports that told of workplace supervisors very casually checking off lists of "accomplishments" and in general making a joke of the standards system. Apparently several efforts have been made to encourage employers to take these tasks more seriously.

As discussed earlier the Training Agency has provided support to the ILBs to cover up to one half of the cost for the development of the standards.

Extent of Coverage

To date the largest pickup of the assessments, about 50%, has come from the participants in government sponsored training programs. Peretz and others believe it is still too early to tell what the real impact will be for industries and individuals in England. The support by the government to develop the standards as a way to revolutionalize the entire education and training system has steadily gained support.

Initially it was developed to address internal problems and issues. Clearly it has been used as a driver to radically change the delivery of education and training by a range of providers including employers. It is making the system more coherent so that equivalent levels are more easily recognized and is promoting the expansion of coverage for certifications in a greater range of occupations. Whether or not it is sufficient and relevant to other countries standards, or whether it will help the U.K. become more competitive in the European Community is unclear. The answers are not yet available, but steps are now being taken to rationalize the NVQs with other countries.

CHAPTER V
CONCLUSIONS

A. LESSONS FOR THE DEVELOPMENT OF SKILL STANDARDS SYSTEMS

There are a series of lessons that one can discern from investigating the standard setting process in other countries.

- The government has a powerful role to play in the industry setting process, particularly in serving as an advocate and promoter for the process. While special initiatives may be a partially effective way for the government to fulfill this role, if the government creates a separate organization and delegates to it the responsibility and authority to create national standards as happened in Australia and the United Kingdom, it seems to have a particularly beneficial effect. Further, this special agency can work under a limited charter with a limited budget and have remarkable success.
- Industries must be responsible for developing the standards. Further, the industry group developing the standards needs formal recognition and approval by the orchestrating agency in order to create those standards. The industry committee must represent all aspects of the industry that have a voice and there must be involvement of employes in the process. There must be cross-sector standards means for representatives to jointly develop common standards, where appropriate.

Fiscal support from the government is required to assist the industries in the development of standards that are to have nationwide applicability. This support can take many forms but without it nationwide skill standards will not exist.

- The standard setting process is facilitated by creating a standardized language and format that must be followed in creating some kind of national standards. Further, all training materials should adhere to this standardized language format and assessment must be linked directly to it. In addition, that language and format must be readily understandable, not just by educators, but by management and the typical employee who may be trained within the system.
- The standard setting process is, in fact, a political and negotiated process. Everyone involved in the process gives up some control and jurisdiction in order to get the job done. However, tax dollars do support the standards setting and training activity so something is gained in return for sharing control.
- An open and clearly understood process is needed to conduct the consultations among the stakeholders. Employers, unions, sub-national units of government, educators, and lead organizations for training must have formal means of having their concerns heard.

▸Education must function as a service provider in the process. There must be education led processes and mechanisms established to facilitate the transformation of the standards established by industry into curriculum based on the identifiable competencies.

▸The standards generate the need to realign intergovernmental systems. The development of a skills standards system has been coupled with the need to establish new operating understandings among the levels of governments responsible for supporting education and training systems. Organizations and support systems must exist to assist the education and training providers in the promulgation of the skills standards.

B. GENERAL UPGRADING OF EDUCATION AND INCREASED ACCESS TO EDUCATION

The growth in the development of government sponsored skills standards in the past decade or so has been undertaken at the same time changes in the education and training systems have been underway.

In the past decade there has been a general pattern to broadened the base of basic preparatory education systems, this has included strengthening the curriculum, and in some countries increasing the number of years of compulsory education. Additionally, for those countries that had traditionally limited the access to postsecondary education, this practice is changing and new access "pathways" are being established for individuals. Many of these new opportunities for continual education are focused on the technical occupations.

Most countries have felt the need to revisit the issue of the school-to-work transition periods. The most typical actions that have flowed from this re-look have been: redoing the curriculum in general, upgrading vocational preparation programs to assure exposure to the new technologies and increase the math and science requirements in these programs, and refine the relationships between schools and the employing community. This last point, related to the employer community has taken various forms but there are two common pathways.

In the countries were there has not been a traditionally strong involvement of employers in initial preparation of workers the emphasis has focused on the development of comprehensive skill standards systems (the English speaking countries.) In the countries where there had been a stronger role played by the employers in the initial training of the workers (such as Germany and Denmark) the effort has focused on refinements, upgrades, consolidation of the number of occupational clusters, and to some degree a realignment of the responsibilities of schools versus employers for the work driven vocational preparation programs.

Japan appears to be an exception to these general observations. They have established clear expectations of the schools to provide the academic grounding and to a very limited extent occupation specific training. They have vested in the workplace the responsibility for worker training and invest public funds at the enterprise level to insure the firms have the capacity to fulfill the obligations to the workers.

C. COUNTRY SPECIFIC LESSONS

Each country that was reviewed offers specific lessons that can help inform the efforts in the United States.

For example, the role and structure of national standards in the basic vocational education and training system of Denmark provides an interesting model for consideration in the United States. Their processes to develop and disseminate national standards by the Ministry of Education provides a different approach to the more detailed training ordinances found in the German Dual System. The role of these national standards in the overall governance of commercial and technical schools and workplace-based training may provide useful lessons for how to use standards in American youth apprentice type programs.

The German Dual System is a leading international example of a school-to-work transition system based on national skill standards. What has been highlighted is the structure and function of the national training ordinances in the regulation of training on the employer side of the system. The ordinances provide quality assurance on the employer side of the system and the certification of apprentices after they complete training. The ordinances have changed a great deal since they were established in the late 1960s, and they are likely to change even more as quality standards in the private sector increase and postsecondary education and further training expand.

The Japanese vocational training system devotes considerable time and resources to defining and testing standards of competence for employed workers. Most of this effort is intended to improve the efficiency and quality of companies through upgrading the skills of employed workers. National skill standards and certification systems in Japan are driven largely by government and employer organizations, with professional associations and educational institutions playing a secondary role. The Ministry of Labor's trade testing system is the largest government-sponsored system of Japan. This system is designed to coordinate private and public training investment and promote private investment in skill development in the workplace. This system provide useful lessons for the United States in financing and administering a skill standards and certification system for adult employed workers.

Canada, in particular, offers the critical lesson that it is important to pay attention to the issue of using common language across several information based support structures such as the classification of occupations and industries. Canada has found several useful ways to help facilitate the occupational counseling and labor exchange services by coordinating the development of common classification systems across several programmatic areas.

Canada also offers an excellent example of how to create portable and easily recognized qualifications based upon the traditional form of apprenticeship training. The processes used to develop the Red Seal exams offer a tested approach for qualifying individuals within this highly decentralized, privately sponsored but publicly supported form of training.

The skills standards systems in both Australia and the United Kingdom offer many lessons for the development of an United States counterpart system. The creation of the common frameworks that will

allow an individual to understand what will be required to achieve career progression -- from the novice status to the highly qualified professional/master level seem to be of particular importance from these two countries. Additionally, there are an array of technical lessons that can be drawn from these countries as it relates to performance assessments and standards development.

As the United States moves forward in the development of a national voluntary skills standards systems it will need to find its own path. There are many useful lessons and techniques that can be adopted from each of the countries reviewed in this report. Perhaps the most fundamental lessons from these other countries are: (a) there must be a common framework that includes common language for the development of skills standards; (b) government must invest at least developmental dollars in assisting the private sector perform many of the varied tasks they are asked to perform; (c) there must be true consultation processes that involve all of the stakeholders. Clarity and agreement will need to evolve regarding what various levels of government need to be doing to enhance the effort, what new forms of support will be needed for the education and training institutions, and what new forms of support will be needed to assist learning in the workplace; (d) substantial support must be provided to the development of the public education and training provideers.. This cannot be a top-down system and; (e) the federal government's most critical role is that of an enabler -- the consensus builder.

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APPENDIX A

SKILL STANDARDS FIELDS FOR VARIOUS COUNTRIES

DENMARK

Farmers:
- Farmer
- Winegrower

Animal breeders, fishery occupations:
- Trained specialist, agricultural or industrial animals
- Fisheries specialist

Agricultural workers, animal keepers
- Animal keeper

Horticulturists
- Gardner
- Florist

Forestry/hunting occupations
- District hunter
- Forester

Miners
- Mining mechanic
- Miner, machine operator

Mineral dressers
- Processor, mining industry

Stoneworkers
- Stonemason
- Sculptor
- Marble and stone cutter
- Coloured stone cutter
- Precious stone engraver
- Agate cutter
- Diamond Cutter
- Precious stone grinder
- Diamond draw-die maker
- Precious stone cutter

Building material manufacturers
- Cement stone and terrazzo maker
- Prefabricated concrete element maker

Ceramic workers
- Ceramic artist
- Industrial skilled ceramic worker
- Skilled ceramic worker
- Ceramic model setter
- Ceramic model maker

Glass makers
- Industrial glass maker
- Glass maker
- Glass maker, laboratory apparatus
- Thermometer maker
- Glass blower, lighting tubes
- Flat glass mechanic
- Glass processor
- Glass cutter and engraver
- Lens grinder, spectacles
- Precision optical worker

Chemical workers
- Junior worker, chemical plant
- Laboratory assistant, chemical industry
- Laboratory assistant, pharmaceutical industry
- Candle maker
- Junior worker, chemical worker
- Vulcaniser

Plastics processors
- Plastics moulder
- Liner, rubber and plastic

Paper makers/processors
- Paper maker
- Packaging mechanic
- Bookbinder
- Steel engraver/relief embosser

Printers
- Typesetter
- Draftsman, master printers
- Galvaniser
- Stereotyper
- Process artist, lithography
- Form maker, book printing
- Flexographic printer
- Mould maker
- Music engraver
- Steel-plate engraver, printing
- Rubber-stamp maker
- Printer
- Lithographic printer
- Textile finisher, printing plant
- Wallpaper printer
- Screen printer
- Technician, reproduction graphics

Wood processors, woodworkers and related occupations
- Wood-working mechanic
- Turner/ivory carver
- Wood sculptor

General brushmaker
Umbrella maker
Basket weaver
Maker of wooden toys

Metal producers, rollers
Process mechanic in the iron and steel/semi-finished products industry
Wire maker

Mould makers
Foundry mechanic
Bell founder
Metal former and founder
Pewtersmith
Type caster

Metal workers (non-cutting)
Wire goods and screen maker
Junior cable worker

Metalworkers (cutting)
Lathe operator
Metal-cutting mechanic (lathe systems)
Turret lathe operator
Metal-cutting mechanic (automatic lathe systems)
Roll lathe operator
Milling-machine operator
Metal-cutting mechanic (milling systems)
Planer
Drill operator
Horizontal boring machine operator
Metal grinder/finisher
Metal cutting mechanic (grinding system)
Grinder/polisher

Metal surface processors/finishers/coaters
Polisher/stain maker, jewelry and decorative implements
Fine grinder
Metal plate engraver
Engraver
Chaser
Universal hardener
Galvaniser and bench grinder
Galvaniser
Enamel letterer

Metal joiners
Fusion welder

Smiths
Spring maker
Cutting tool mechanic
Plant fitter
Coppersmith

Metalsmiths - thin sheet metal, fitters
Plumber
Construction mechanic
Vehicle body maker
Aircraft maker
Plumber, gas and water connections
Engineer, central heating and ventilation
Plant fitter
Pipe systems engineer

Mechanical engineers
Mechanical engineer, metal structures
Construction mechanic
Model maker, metal
Plastics engineer
Industrial mechanic
Engineering mechanic

Mechanics
Motor vehicle mechanic
Automobile mechanic
Mechanic, agricultural machines
Aircraft mechanic
Aircraft engine mechanic
Repairman, precision instruments
Industrial mechanic
Surgical instrument maker
Tool mechanic
Gunsmith
Orthopaedic mechanic
Refrigeration engineer
Motorcycle mechanic
Equipment assembler
Machine assembler
Parts fitter
Watchmaker

Toolmakers
Tool maker
Tool mechanic
Engraver, roll embossing
Steel engraver/die maker

Fine metalworkers and associated occupations
Brazier
Brazier and metal knob maker
Goldsmith
Jewelry goldsmith
Silversmith
Gem setter
Foil maker, gold, silver, aluminum
Dental prosthesis maker
Optometrist

Piano and harpsichord maker
Organ and harmonium maker
Musical brass instruments maker
Maker of brass and percussion instruments
Violin maker
Guitar maker
Woodwind instruments maker
Hand-drawn instruments maker
Model maker, biology

Electricians
Electrical fitter
Electronic specialist, energy systems
Automobile electrician
Industrial electronic specialist
Electronic specialist, telecommunications
Electronic specialist, communications (telecommunications systems)
Electronic specialist, communications (information systems)
Electronic specialist, communications (radio engineering)
Constructor, electrical machinery
Assembler, electrical machinery
Electrical engineer/electrician
Electronic specialist, office information
Mechanic, communications equipment
Technician, radio and television
Acoustical specialist, hearing aids

Spinning occupations
Textile machine operator, spinning
Textile mechanic
Rope maker

Textile manufacturers
Pattern programmer, weaving
Textile machine operator, weaving
Textile mechanic, ribbon weaving
Weaver
Repairs tailor
Textile mechanic, weaving
Textile machine operator, tufting
Textile machine operator, knitting
Rubber stocking knitter
Knitter
Textile mechanic, double rib loom knitting
Textile mechanic, straight and jersey knitting
Textile mechanic, hosiery knitting, seam and round
Textile machine operator, non-wovens
Decorative cloth craftmaker

Textile processors
Garmet cutter
Tailor, men's clothing
Tailor, ladies clothing
Garment maker
Garment sewer
Shirt maker
Embroiderer
Embroidered soft-goods designer
Tailor, women's fashions and accessories
Hatter and capmaker
Cap and women's hat maker
Milliner
Necktie seamster
Maker-up, plastic and heavy-weitht fabrics
Sailmaker

Textile finishers
Textile finisher, dyeing plant
Textile machine operator, finishing
Textile finisher, dressing
Textile calenderer
Pleat presser

Leather manufacturers, leather and pelt processors
Tanner
Shoemaker
Orthopaedic shoemaker
Shoe manufacturing specialist
Stitcher, shoes and leatherware
Saddler
Fancy saddlemaker
Orthopaedic bandager
Fancy pursemaker
Purse and luggage maker
Glove maker
Fur finisher
Worker, fur industry
Furrier

Bakery and confectionery manufacturers
Baker
Confectioner

Meat and fish processors
Butcher

Food preparers
Cook

Drinks and luxury goods manufacturers
Cooper, wine industry
Brewer and maltster
Distiller
Distiller, industrial
Specialist, fruit juice technology

Other food-related occupations
- Dairy supervisor, quality and processing
- Grain miller
- Food technology specialist
- Sweet foods specialist

Bricklayers, concrete workers
- Skilled worker, superstructures
- Bricklayer
- Baking-oven maker
- Fireplace and chimney builder
- Concrete and reinforced concrete worker

Carpenters, roofers, scaffolders
- Interior installations specialist, construction industry
- Carpenter
- Carpenter, shipbuilding
- Roofer
- Scaffolder

Road construction, substructures and excavations
- Skilled worker, road construction
- Skilled worker, substructures and excavations
- Track layer
- Skilled worker, hydraulic engineering
- Well builder
- Canal construction worker
- Construction machine operator

Interior finishers
- Stucco plasterer
- Insulator, in industry
- Insulator/assembler
- Glue sealer
- Insulator, heat, cold and noise insulation
- Drywall installer
- Asphalter
- Tile, plate and mosaic setter
- Maker of tile ovens and hot-air heating systems
- Glazier
- Floor layer, plastered stone

Interior decorators, upholsterers
- Interior decorator
- Parquetry floor layer
- Upholsterer
- Vehicle upholsterer
- Seamster, upholstery and drapery

Joiners, model makers (wood)
- Joiner
- Wood mechanic
- Model maker, wood
- Model maker/joiner
- Wheelwright
- Cartwright
- Cooper
- Boatbuidler, wood
- Shipfitter/hullmaker
- Light plane maker
- Maker of Venetian blinds and louvres

Painters, lacquerers and related occupations
- Painter and lacquerer
- Lacquerer
- Gilder
- Glass and porcelain painter
- Glass and ceramic painter

Goods inspectors, dispatchers
- Packing specialist

Engineers
- Soil and irrigatation engineer
- Road construction engineer
- Construction engineer, water supply administration
- Assistant mining surveyor
- Assistant surveyor

Technical specialists
- Laboratory assistant, biology
- Laboratory assistant, plant pathology
- Laboratory assistant, dairy industry
- Laboratory assistant, agricultural technology
- Laboratory assistant, physics
- Materials analyst, physics
- Technician, measurements and controls
- Assistant, engineering computations
- Instrument observer and heating equipment tender
- Laboratory assistant, chemical industry
- Construction materials analyst
- Precious metals analyst
- Materials analyst, chemical industry
  - Glass and ceramics industry
  - Stone and sand materials
- Textile laboratory assistant, chemical processes
- Textile laboratory assistant, physical processes
- Lacquer man
- Photo-laboratory assistant
- Film and video laboratory assistant
- Draftsman, engineering

Construction draftsman
Draftsman
Cartographer
Planning engineer
Draftsman, water supply administration

Sales specialists
Business specialist, wholesale and foreign trade
Business specialist, retail trade
Salesperson
Specialist salesperson, food trade
Publishing business specialist
Bookseller
Retailer, musical instruments
Druggist
Pharmacist
Filling station operator

Banking and insurance business specialists
Banker
Business specialist, savings banks
Business specialist, insurance

Other service industry specialists and associated occupations
Business specialist, shipping and forwarding
Business specialist, maritime commerce
Business specialist, air transportation
Maritime cargo inspector
Business specialist, travel and tourism
Advertising sales specialist

Rail and road transport occupations
Business specialist, rail and road transportation
Motor vehicle driver
Road maintenance worker
Railwayman, technical service

Waterway and air transport occupations
Boatman, inland waterways
Lighterman
Harbour boat captain

Communications occupations
Postal services specialist

Warehouse administrators, warehouse/ transport processors
Procurement and sales specialist, artificial teeth and dentures
Warehouse administration specialist

Businessmen, organisers, auditors
Assistant, business and tax consulting services

Accounting specialists, data processing specialists
Data processing salesman

Office specialists, office assistants
Specialist in office communications
Commercial clerk
Specialist employee for promotion of labour
Staff employee, judicial administration
Clerical specialist, social security administration
Administrative employee
Business specialist, industrial production and sales
Lawyer's assistant
Notary's assistant
Lawyer's and notary's assistant
Patent attorney's assistant
Business specialist, real estate and housing
Production assistant, jewelry industry, pocket and wrist watches
Stenographer-secretary

Safety-oriented occupations
Chimney sweep

Publishers, interpreters, librarians
Library assistant

Artists and associated occupations
Textile designer
Photoengraver
Display and neon sign assembler
Window dresser
Photographer
Retoucher, phototype printing
Retoucher, phototype printing
Horse expert

Other health service occupations
Physician's assistant
Dental assistant, clerical
Veterinary assistant
Laboratory assistant, veterinary medicine

Teachers
Assistant swimming master/pool manager

Grooming
Hairdresser

Hotels and catering
- Office and sales clerk, hotel and restaurant trade
- Hotel specialist
- Restaurant specialist
- Assistant, hotel and restaurant industry

Domestic occupations
- Household manager

Cleaning occupations
- Textile cleaner
- Building cleaner
- Supply and disposal specialist

GERMANY

Farmers:
- Farmer
- Winegrower

Animal breeders, fishery occupations:
- Trained specialist, agricultural or industrial animals
- Fisheries specialist

Agricultural workers, animal keepers
- Animal keeper

Horticulturists
- Gardner
- Florist

Forestry/hunting occupations
- District hunter
- Forester

Miners
- Mining mechanic
- Miner, machine operator

Mineral dressers
- Processor, mining industry

Stoneworkers
- Stonemason
- Sculptor
- Marble and stone cutter
- Coloured stone cutter
- Precious stone engraver
- Agate cutter
- Diamond Cutter
- Precious stone grinder
- Diamond draw-die maker
- Precious stone cutter

Building material manufacturers
- Cement stone and terrazzo maker
- Prefabricated concrete element maker

Ceramic workers
- Ceramic artist
- Industrial skilled ceramic worker
- Skilled ceramic worker
- Ceramic model setter
- Ceramic model maker

Glass makers
- Industrial glass maker
- Glass maker
- Glass maker, laboratory apparatus
- Thermometer maker
- Glass blower, lighting tubes
- Flat glass mechanic

- Glass processor
- Glass cutter and engraver
- Lens grinder, spectacles
- Precision optical worker

Chemical workers
- Junior worker, chemical plant
- Laboratory assistant, chemical industry
- Laboratory assistant, pharmaceutical industry
- Candle maker
- Junior worker, chemical worker
- Vulcaniser

Plastics processors
- Plastics moulder
- Liner, rubber and plastic

Paper makers/processors
- Paper maker
- Packaging mechanic
- Bookbinder
- Steel engraver/relief embosser

Printers
- Typesetter
- Draftsman, master printers
- Galvaniser
- Stereotyper
- Process artist, lithography
- Form maker, book printing
- Flexographic printer
- Mould maker
- Music engraver
- Steel-plate engraver, printing
- Rubber-stamp maker
- Printer
- Lithographic printer
- Textile finisher, printing plant
- Wallpaper printer
- Screen printer
- Technician, reproduction graphics

Wood processors, woodworkers and related occupations

Wood-working mechanic
Turner/ivory carver
Wood sculptor
General brushmaker
Umbrella maker
Basket weaver
Maker of wooden toys

Metal producers, rollers
Process mechanic in the iron and steel/semi-finished products industry
Wire maker

Mould makers
Foundry mechanic
Bell founder
Metal former and founder
Pewtersmith
Type caster

Metal workers (non-cutting)
Wire goods and screen maker
Junior cable worker

Metalworkers (cutting)
Lathe operator
Metal-cutting mechanic (lathe systems)
Turret lathe operator
Metal-cutting mechanic (automatic lathe systems)
Roll lathe operator
Milling-machine operator
Metal-cutting mechanic (milling systems)
Planer
Drill operator
Horizontal boring machine operator
Metal grinder/finisher
Metal cutting mechanic (grinding system)
Grinder/polisher

Metal surface processors/finishers/coaters
Polisher/stain maker, jewelry and decorative implements
Fine grinder
Metal plate engraver
Engraver
Chaser
Universal hardener
Galvaniser and bench grinder
Galvaniser
Enamel letterer

Metal joiners
Fusion welder

Smiths
Spring maker
Cutting tool mechanic
Plant fitter
Coppersmith

Metalsmiths - thin sheet metal, fitters
Plumber
Construction mechanic
Vehicle body maker
Aircraft maker
Plumber, gas and water connections
Engineer, central heating and ventilation
Plant fitter
Pipe systems engineer

Mechanical engineers
Mechanical engineer, metal structures
Construction mechanic
Model maker, metal
Plastics engineer
Industrial mechanic
Engineering mechanic

Mechanics
Motor vehicle mechanic
Automobile mechanic
Mechanic, agricultural machines
Aircraft mechanic
Aircraft engine mechanic
Repairman, precision instruments
Industrial mechanic
Surgical instrument maker
Tool mechanic
Gunsmith
Orthopaedic mechanic
Refrigeration engineer
Motorcycle mechanic
Equipment assembler
Machine assembler
Parts fitter
Watchmaker

Toolmakers
Tool maker
Tool mechanic
Engraver, roll embossing
Steel engraver/die maker

Fine metalworkers and associated occupations
Brazier
Brazier and metal knob maker
Goldsmith
Jewelry goldsmith
Silversmith

Gem setter
Foil maker, gold, silver, aluminum
Dental prosthesis maker
Optometrist
Piano and harpsichord maker
Organ and harmonium maker
Musical brass instruments maker
Maker of brass and percussion instruments
Violin maker
Guitar maker
Woodwind instruments maker
Hand-drawn instruments maker
Model maker, biology

Electricians
Electrical fitter
Electronic specialist, energy systems
Automobile electrician
Industrial electronic specialist
Electronic specialist, telecommunications
Electronic specialist, communications (telecommunications systems)
Electronic specialist, communications (information systems)
Electronic specialist, communications (radio engineering)
Constructor, electrical machinery
Assembler, electrical machinery
Electrical engineer/electrician
Electronic specialist, office information
Mechanic, communications equipment
Technician, radio and television
Acoustical specialist, hearing aids

Spinning occupations
Textile machine operator, spinning
Textile mechanic
Rope maker

Textile manufacturers
Pattern programmer, weaving
Textile machine operator, weaving
Textile mechanic, ribbon weaving
Weaver
Repairs tailor
Textile mechanic, weaving
Textile machine operator, tufting
Textile machine operator, knitting
Rubber stocking knitter
Knitter
Textile mechanic, double rib loom knitting
Textile mechanic, straight and jersey knitting
Textile mechanic, hosiery knitting, seam and round
Textile machine operator, non-wovens
Decorative cloth craftmaker

Textile processors
Garment cutter
Tailor, men's clothing
Tailor, ladies clothing
Garment maker
Garment sewer
Shirt maker
Embroiderer
Embroidered soft-goods designer
Tailor, women's fashions and accessories
Hatter and capmaker
Cap and women's hat maker
Milliner
Necktie seamster
Maker-up, plastic and heavy-weight fabrics
Sailmaker

Textile finishers
Textile finisher, dyeing plant
Textile machine operator, finishing
Textile finisher, dressing
Textile calenderer
Pleat presser

Leather manufacturers, leather and pelt processors
Tanner
Shoemaker
Orthopaedic shoemaker
Shoe manufacturing specialist
Stitcher, shoes and leatherware
Saddler
Fancy saddlemaker
Orthopaedic bandager
Fancy pursemaker
Purse and luggage maker
Glove maker
Fur finisher
Worker, fur industry
Furrier

Bakery and confectionery manufacturers
Baker
Confectioner

Meat and fish processors
Butcher

Food preparers
Cook

Drinks and luxury goods manufacturers
Cooper, wine industry
Brewer and malster

Distiller
Distiller, industrial
Specialist, fruit juice technology

Other food-related occupations
Dairy supervisor, quality and processing
Grain miller
Food technology specialist
Sweet foods specialist

Bricklayers, concrete workers
Skilled worker, superstructures
Bricklayer
Baking-oven maker
Fireplace and chimney builder
Concrete and reinforced concrete worker

Carpenters, roofers, scaffolders
Interior installations specialist, construction industry
Carpenter
Carpenter, shipbuilding
Roofer
Scaffolder

Road construction, substructures and excavations
Skilled worker, road construction
Skilled worker, substructures and excavations
Track layer
Skilled worker, hydraulic engineering
Well builder
Canal construction worker
Construction machine operator

Interior finishers
Stucco plasterer
Insulator, in industry
Insulator/assembler
Glue sealer
Insulator, heat, cold and noise insulation
Drywall installer
Asphalter
Tile, plate and mosaic setter
Maker of tile ovens and hot-air heating systems
Glazier
Floor layer, plastered stone

Interior decorators, upholsterers
Interior decorator
Parquetry floor layer
Upholsterer
Vehicle upholsterer
Seamster, upholstery and drapery

Joiners, model makers (wood)
Joiner
Wood mechanic
Model maker, wood
Model maker/joiner
Wheelwright
Cartwright
Cooper
Boatbuidler, wood
Shipfitter/hullmaker
Light plane maker
Maker of Venetian blinds and louvres

Painters, lacquerers and related occupations
Painter and lacquerer
Lacquerer
Gilder
Glass and porcelain painter
Glass and ceramic painter

Goods inspectors, dispatchers
Packing specialist

Engineers
Soil and irratation engineer
Road construction engineer
Construction engineer, water supply administration
Assistant mining surveyor
Assistant surveyor

Technical specialists
Laboratory assistant, biology
Laboratory assistant, plant pathology
Laboratory assistant, dairy industry
Laboratory assistant, agricultural technology
Laboratory assistant, physics
Materials analyst, physics
Technician, measurements and controls
Assistant, engineering computations
Instrument observer and heating equipment tender
Laboratory assistant, chemical industry
Construction materials analyst
Precious metals analyst
Materials analyst, chemical industry
- Glass and ceramics industry
- Stone and sand materials
Textile laboratory assistant, chemical processes
Textile laboratory assistant, physical processes
Lacquer man
Photo-laboratory assistant

Film and video laboratory assistant
Draftsman, engineering
Construction draftsman
Draftsman
Cartographer
Planning engineer
Draftsman, water supply administration

Sales specialists
Business specialist, wholesale and foreign trade
Business specialist, retail trade
Salesperson
Specialist salesperson, food trade
Publishing business specialist
Bookseller
Retailer, musical instruments
Druggist
Pharmacist
Filling station operator

Banking and insurance business specialists
Banker
Business specialist, savings banks
Business specialist, insurance

Other service industry specialists and associated occupations
Business specialist, shipping and forwarding
Business specialist, maritime commerce
Business specialist, air transportation
Maritime cargo inspector
Business specialist, travel and tourism
Advertising sales specialist

Rail and road transport occupations
Business specialist, rail and road transportation
Motor vehicle driver
Road maintenance worker
Railwayman, technical service

Waterway and air transport occupations
Boatman, inland waterways
Lighterman
Harbour boat captain

Communications occupations
Postal services specialist

Warehouse administrators, warehouse/ transport processors
Procurement and sales specialist, artificial teeth and dentures
Warehouse administration specialist

Businessmen, organisers, auditors
Assistant, business and tax consulting services

Accounting specialists, data processing specialists
Data processing salesman

Office specialists, office assistants
Specialist in office communications
Commercial clerk
Specialist employee for promotion of labour
Staff employee, judicial administration
Clerical specialist, social security administration
Administrative employee
Business specialist, industrial production and sales
Lawyer's assistant
Notary's assistant
Lawyer's and notary's assistant
Patent attorney's assistant
Business specialist, real estate and housing
Production assistant, jewelry industry, pocket and wrist watches
Stenographer-secretary

Safety-oriented occupations
Chimney sweep

Publishers, interpreters, librarians
Library assistant

Artists and associated occupations
Textile designer
Photoengraver
Display and neon sign assembler
Window dresser
Photographer
Retoucher, phototype printing
Retoucher, phototype printing
Horse expert

Other health service occupations
Physician's assistant
Dental assistant, clerical
Veterinary assistant
Laboratory assistant, veterinary medicine

Teachers
Assistant swimming master/pool manager

Grooming
Hairdresser

Hotels and catering

Office and sales clerk, hotel and
restaurant trade
Hotel specialist
Restaurant specialist
Assistant, hotel and restaurant industry

Domestic occupations
Household manager

Cleaning occupations
Textile cleaner
Building cleaner
Supply and disposal specialist

JAPAN

Agriculture and forestry:
Horticulture,
Landscape gardening

Mining:
Mining,
Mine surveying,
Mining machinery and wiring

Metallic material manufacturing:
Iron and steel manufacturing,
Non-ferrous metal manufacturing,
Casting,
Forging,
Heat treatment,
Powder metallurgy,

Metal processing:
Machining,
Die making,
Metal press,
Welding,
Boiler making,
Constructional steel work,
Metal plate work,
Metal chasing,
Plating,
Anodization,
▵ Buffing
▵ Machine part inspection

Electric equipment manufacturing and wiring:
Electronic equipments,
Electric equipments,
Electric control circuit assemblage,
Electron tube manufacturing,
Electric cable casing,
Semiconductor product manufacturing
Storage battery manufacturing,
Dry cell manufacturing,
Home electric appliance services,
Electricity generation and transformation
Electricity transmission and distribution,
Electric wiring

Drawing, testing and inspection:
Architectural drawing,
Machinery drawing,
Electric circuit drawing,
Ship drawing,
Aircraft drawing,
Tracing,
Structure drawing,

Chemical analysis,
Metallic material testing,
Pollution monitoring

Operation of installed machinery and construction machinery:
Boiler operation,
Crane operation,
Machine operation,
Construction machine operation

Transportation machinery manufacturing:
Automobile manufacturing,
Automobile maintenance,
Aircraft manufacturing,
Aircraft maintenance,
Railway car manufacturing,
Railway car maintenance,
Bicycle repair,
Shipbuilding,
Boat Building

Measuring instrument and optical equipment manufacturing:
Clock and watch manufacturing,
Clock and watch repair,
Optical glass processing,
Optical equipment manufacturing,
Measuring instrument manufacturing,
Scientific instrument manufacturing

Other machinery manufacturing:
Machine assemblage,
Lumbering machine maintenance,
Internal combustion engines,
Sewing machine maintenance,
Construction machine maintenance,
Agricultural machine maintenance,
Refrigeration and air conditioning

Chemical product manufacturing:
General chemistry,
High-pressure synthesis,

Gas chemistry,
Electro-Chemistry
Petroleum refinery,
Chemical fiber manufacturing,
Gunpowder manufacturing

Spinning and weaving:
Spinning machine adjustment,
Weaving machine adjustment,
Weaving,
Dyeing,
Dyeing correction,
Knitwear,
Knitting

Cutting and sewing:
Dressmaking,
Tailoring,
Kimono sewing,
Embroidery,
Bedclothes making,
Canvas goods manufacturing,
Sewing

Manufacturing of wood, bamboo, grass, and vine products:
Lumbering,
Plywood manufacturing,
Special plywood manufacturing,
Wooden pattern making,
Woodworking,
Wooden crafts,
Bamboo and cane crafts

Foodstuffs and drinks manufacturing:
Noodle manufacturing,
Confectionery,
Meat processing and manufacturing,
Marine product processing and manufacturing,
Fermented product manufacturing,
Frozen food manufacturing

Manufacturing of pulp, paper, paper goods, etc.:
Pulp manufacturing,
Paper manufacturing,
Carton manufacturing

Printing and binding:
Plate making and printing,
Bookbinding,
Light printing

Rubber and plastic products manufacturing:
Rubber product manufacturing,
Tire recapping,
Plastic molding

Leather and leather goods manufacturing:
Leather tanning,
Shoemaking,
Leather goods manufacturing

Ceramic and stone products manufacturing:
Glass product manufacturing,
Enamel product manufacturing,
Ceramic burning,
Pottery,
Concrete product manufacturing,
Stone working,
Cloisonne making

Transportation, communication, and utilities:
▵ Automobile driving,
▵ Forklift operation,
Radio communication,
▵ Radio engineering,
PBX operation,
Port loading,
Slinging,
Industrial packaging,
Cargo handling

Various manufacturing:
Toy manufacturing,
Lacquer ware making,
Ornamental metal ware casting,
Metallic arts and crafts,
Jewelry,
Stamp engraving,
Upholstery,
Paper hanging,
Painting, Advertising arts,
Artificial limb and appendage making

Construction:
House
House maintenance,
Roofing,
Scaffolding,
Plastering,
Furnace building,
Concrete block building,

Tiling,
Tatami making,
Plumbing,
Housing equipment installation,
Well boring,
Reinforced concrete work,
Prefabricated building,
Slating,
Waterproofing,
Interior service,
Floor finishing,
Heat insulation,
Sash setting, Glazing,
Civil engineering,
Geological survey,
Land survey

Clerical work:
Accounting,
Business administration,
Japanese typewriting,
English typewriting,
Secretary,
Office work,
Factory management

Sales:
Sales,
Realty dealing

Services:
Housekeeping,
Photography,
Haircutting,
Hairdressing,
Hotel work,
Building sanitary management,
Building equipment maintenance
Cooking,
Meal service,
Cleaning

Others:
Clinical examination,
Designing,
Flower decoration,
Information processing,
Computer operation and programming,
Microcomputer control systems,
Nuclear power technology

② Special Courses

Production machinery,
Metal forming,
Industrial electronics,
Electrical work,
Automobile maintenance,
Dyeing and weaving,
Printing technology,
Confectionery,
Architecture,
Plastering,
Building equipment designing and installation,
Interior designing,
Civil engineering,
Environmental chemistry,
Painting technology,
Port distribution
Port transportation,
Radio engineering,
Clinical examination,
Industrial arts and design,
Information processing,
Nuclear power technology

(2) Upgrading Training

① Grade 1 and Grade 2 Certified Skilled Worker Training Courses

Horticultural decoration,
Landscape gardening,
Well boring,
Metal melting,
Casting,
Forging,
Metal heat treatment,
Powder metallurgy,
Machining,
Electric-discharge machining,
Die making,
Metal press,
Iron work,
Building metal plate work,
Factory metal plate work,
Industrial engraving,
Electroplating,
Aluminum anodizing,
Metal spring manufacturing,
Rope processing,
Finishing,
Stone-cutting tool grinding,
Lumbering saw setting,
Machine inspection,

Die Casting,
Machine maintenance,
Electronic equipment assemblage,
Electric equipment assemblage,
Semiconductor product manufacturing,
Home electric health-equipment adjustment,
Vending machine adjustment,
Railroad car manufacturing and maintenance,
Ship equipping,
Clock and watch repair,
Eyeglass lens processing,
Optical equipment manufacturing,
Copying machine assemblage,
Internal combustion engine assemblage,
Pneumatic system assemblage,
Hydraulic system adjustment,
Sewing machine maintenance,
Construction machine maintenance,
Farming machine maintenance,
Refrigerating and air conditioning equipment installation,
Weaving machine adjustment,
Dyeing,
Knit goods manufacturing,
Women's and children's clothes manufacturing,
Men's clothes manufacturing,
Kimono making,
Bedclothes manufacturing,
Canvas goods manufacturing,
Cloth sewing,
Woodworking machine maintenance,
Plywood manufacturing,
Wood machining,
Wood pattern making
Furniture manufacturing,
Fittings making,
Bamboo arts and crafts,
Carton and corrugated paper boxes manufacturing,
Block copy making,
Plate making,
Printing,
Bookbinding,
Tire recapping,
Plastic molding,
Fiberglass-reinforced plastic molding,
Glass product manufacturing,
Enamel work,
Pottery,
Masonry,
Bread baking,
Confectionery,
Ham and sausage making,
Fish cake making,
Miso making,
Sake brewing,
Carpentry,
Tile roofing,
Scaffolding,
Plastering,
Furnace construction,
Architectural block laying,
Tiling,
Tatami making,
Plumbing
Kitchen equipment installation,
Form working,
Reinforcing bar installation,
Pressurized concreting,
Waterproofing,
Interior finishing,
Slating,
Heat insulation,
Curtain-wall furnishing,
Sash setting
Glazing,
Well point installation,
Technical illustration,
Architectural drawing,
Machinery and plant drawing,
Electric circuit drawing,
Chemical analysis,
Metal material testing,
Lacquer ware making,
Precious metal accessory making,
Stamp engraving,
Chair upholstery,
Paper hanging,
Painting,
Advertising Arts,
Artificial limb and appendage making,
Stage effect adjustment,
Industrial packaging,
Photography,
Merchandise decoration and display,
Flower decoration

② Mono-grade Certified Skilled Worker Training Courses

Injection molding,
Metal finishing,
Electronic circuit connection,
Machine noodle-making,
Platform frame construction,
Brick laying,

ALC panel work,
Concrete block laying,
Bathtub and bath equipment installation,
Resin adhesive injection and application,
Balcony construction,
Road-surface sign painting,
Paint color mixing,
Building cleaning,
Industrial washing

Job Types for Trade Skill Test

Horticultural decoration
Landscape gardening,
Well boring,
Metal melting,
Casting,
Forging,
Metal heat treatment,
Powder metallurgy,
Machining,
Electric-discharge machining,
Die making,
Metal press,
Iron work,
Building metal plate work,
Factory metal plate work,
Industrial engraving,
Electroplating,
Aluminum anodizing,
Injection molding,
Metal spring manufacturing,
Rope processing,
Finishing,
Metal finishing,
Stone-cutting tool grinding,
Lumbering saw setting,
Machine inspection,
Die casting,
Machine maintenance,
Electronic circuit connection,
Electronic equipment assemblage,
Electronic equipment assemblage,
Semiconductor product manufacturing,
Home electric health-equipment adjustment,
Vending machine adjustment,
Railroad car manufacturing and maintenance,
Ship equipping,
Clock and watch repair,
Eyeglass lens processing,
Optical equipment manufacturing,
Copying machine assemblage,
Internal combustion engine assemblage,
Pneumatic system assemblage,
Hydraulic system adjustment,
Sewing machine maintenance,
Construction machine maintenance,
Farming machine maintenance
Refrigerating and air conditioning equipment installation,
Weaving machine adjustment,
Dyeing,
Knit goods manufacturing,
Women's and children's clothes manufacturing,
Men's clothes manufacturing,
Kimono making,
Bedclothes manufacturing,
Canvas goods manufacturing,
Cloth sewing,
Woodworking machine maintenance,
Plywood manufacturing,
Wood machining,
Wood pattern making,
Furniture manufacturing,
Fittings making,
Bamboo arts and crafts,
Carton and corrugated paper boxes manufacturing,
Block copy making,
Plate making,
Printing,
Bookbinding,
Tire recapping,
Plastic molding,
Fiberglass-reinforced plastic molding,
Glass product manufacturing,
Enamel work,
Pottery,
Masonry,
Bread baking,
Confectionery,
Machine noodle-making,
Ham and sausage making,
Fish cake making,
Miso making,
Sake brewing,
Carpentry,
Platform frame construction,
Tile roofing,
Scaffolding,
Plastering,
Brick laying,
Furnace construction,
Archictectural block laying,
Industrial packaging,
Photography,
Cooking,
Building cleaning,

Industrial washing,
Merchandise decoration and display,
Flower decoration
ALC panel work,
Concrete block laying,
Tiling,
Tatami making
Plumbing,
Bathtub and bath equipment installation,
Kitchen equipment installation,
Form working,
Reinforcing bar installation,
Pressurized concreting?,
Waterproofing,
Resin adhesive injection and application,
Interior finishing,
Heat insulation,
Curtain-wall furnishing,
Sash setting,
Balcony construction,
Glazing,
Well point installation,
Technical illustration,
Architectural drawing,
Machinery and plant drawing,
Electric circuit drawing,
Chemical analysis,
Metal material testing,
Lacquer ware making,
Precious métal accessory making,
Stamp engraving,
Chair upholstery,
Paper hanging,
Painting,
Road-surface sign painting,
Paint color mixing,
Advertising arts,
Artificial limb and appendage making,
Stage effect adjustment

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